SEPTEMBER 1956

PIT and QUARRY

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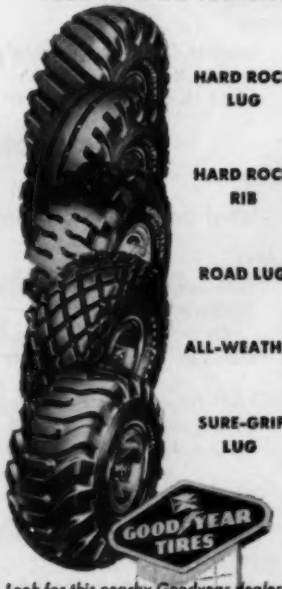

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pit and quarry

THE BASIC MAGAZINE OF A BASIC INDUSTRY

SEPTEMBER 1956 Vol. 49 No. 3

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Cover Picture

• On the front cover of this issue of PIT AND QUARRY is a view to the southwest of the main quarry of the Elmhurst-Chicago Stone Company, pioneer producer of crushed stone in the Chicago area. This view shows several levels of earlier and present workings. The former inclined quarry haulage track can be seen to the left of the crusher house (left center) which has been replaced by the end-dump truck units (foreground). The screen house, ready-mix plant, and block plant are to be seen on the far rim of the quarry.

Published on the first of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel and other nonmetallic minerals.

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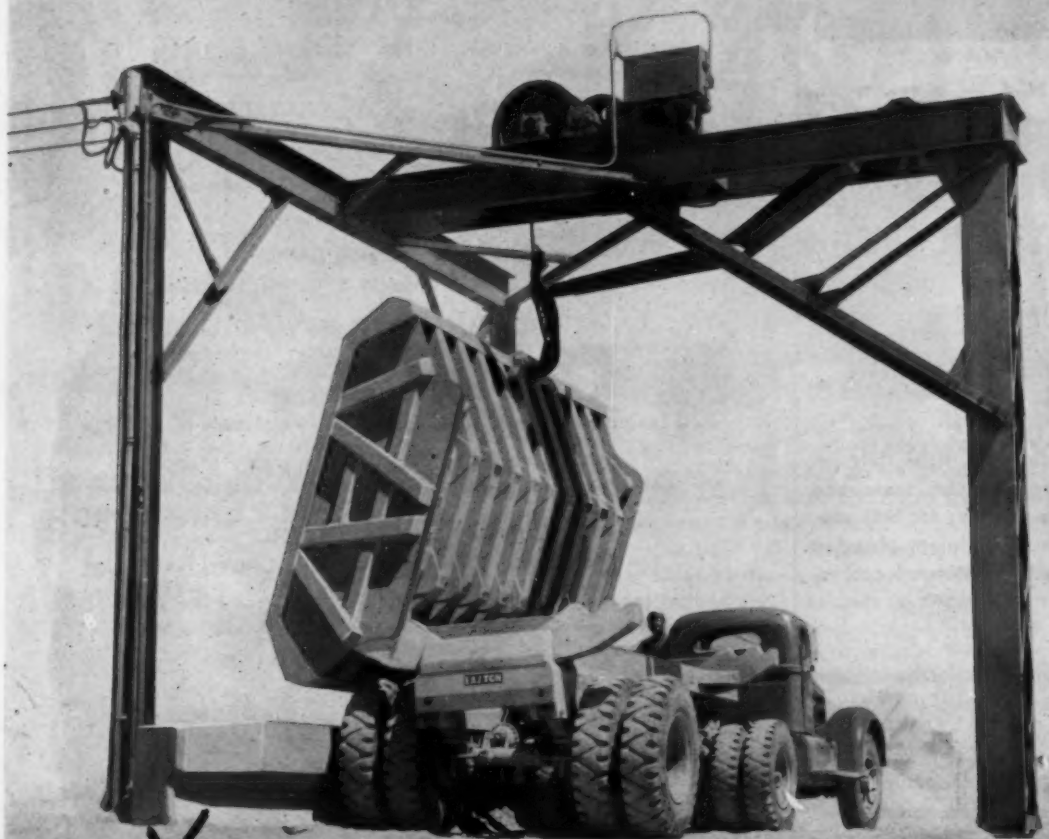

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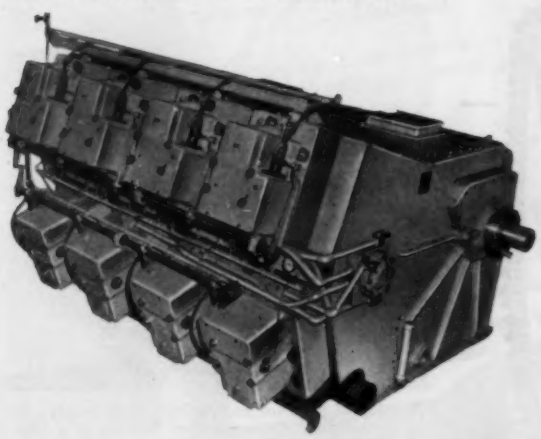

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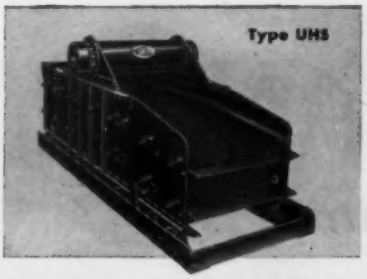

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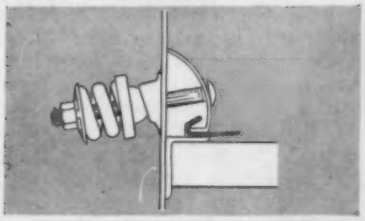

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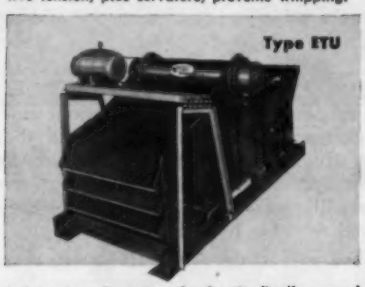
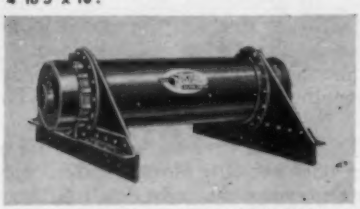


End tension, featuring the longitudinally curved screen surface in combination with the opposed elliptical throw of the Unitized Lifetime Vibrating Mechanism, available in 1 to 4 decks, from 2½′ x 4′ to 5′ x 10′.



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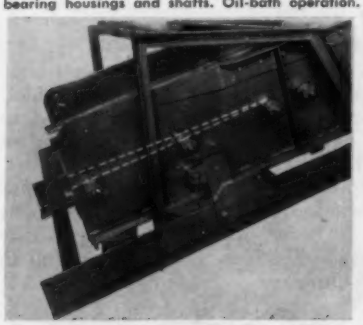

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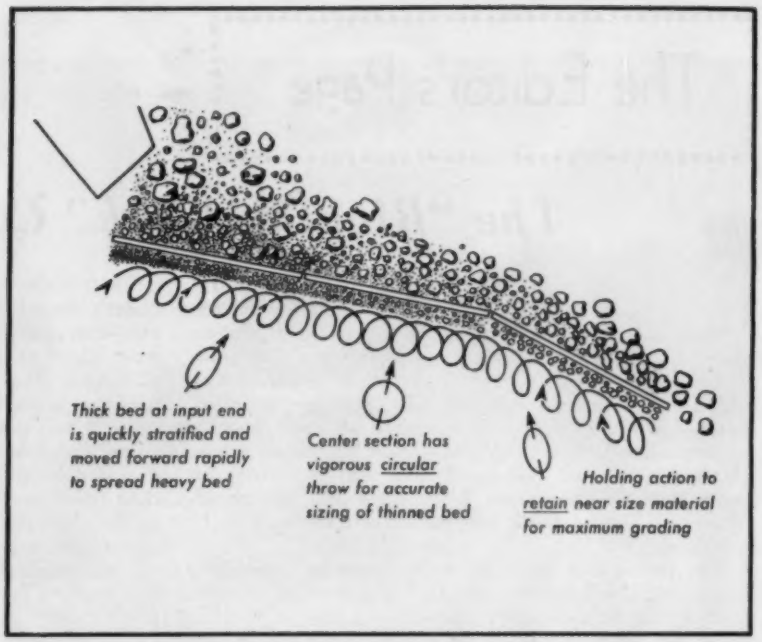
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The Editor's Page

The "Right to Work" Controversy

IN spite of the wide publicity given to the bitter dispute between employers and labor unions over the "right to work laws," there is still much confusion about these laws in the minds of employers and the public. There is no such confusion in the minds of union leaders, who are making every effort to have these laws repealed. Employers whose plants are unionized also are probably very familiar with this subject. Those employers whose plants are not yet unionized, and who feel that this controversy will not affect them, must also become interested if further union domination of industry is to be prevented.

The position of those who are opposing compulsory unionism is well summarized by the following excerpts from a statement of policy adopted as a part of its 1956 legislative program by the New York State Conference Board of Farm Organizations.

"Eighteen states have adopted 'right to work' laws which, in effect, say that no labor contract shall be valid if it deprives a man of a job, either because he belongs to a union or because he does not.

"Years ago, employers sometimes not only refused to hire a union member, but compelled their workers to sign agreements not to join a union, under penalty of being dismissed. The union called this the 'Yellow Dog Contract' and fought it to the Supreme Court, where it was declared illegal.

"Now the unions want exactly the same principle applied in their favor. They want legal power to make contracts that can prohibit any person from getting or holding a job, unless he pays dues to them.

THE "right to work" movement, spurred by the yeoman efforts of the National Right to Work Committee and others interested in retaining whatever freedom is left in this country, seems to be making progress in some directions but not in others. A year ago there were "right to work" laws in 18 states, and such laws were at issue in at least 15 other state legislatures. Recently Louisiana repealed its law in part under questionable circumstances and there is no indication that any other states will adopt such laws in the near future.

There is also much reason for concern over the Supreme Court's recent decision in the Union Pacific Railroad case that the Railway Labor Act overrides conflicting state Right to Work laws. "By this ruling," according to Nathan Thorington, board chairman of the National Right to Work Committee, "they have taken away from railroad and airline workers the protection against forced union membership which 18 states thought they had provided in their own Right to Work Laws. Likewise, they have served warning that one simple amendment to the Taft-Hartley Act, knocking out the clause that specifically permits states to pass laws banning compulsion, would destroy such protection for all other American workers."

LABOR unions, on the other hand, claim to be making "steady, widespread progress" toward the union shop, or compulsory unionism, according to a recent report from the AFL-CIO. This report states that "more than 80 percent of employers dealing with unions now have signed such agreements." It is further stated that "even in the states which have adopted legislation to prohibit union security provisions, many employers have been signifying their willingness to adopt such provisions if and when permitted to do so by law."

The political implications of the AFL-CIO merger are being watched closely by all groups fighting compulsory unionism, since the announced objective of this huge new organization is to make this principle universal throughout the nation. Its announced objectives include the repeal of the Taft-Hartley Act, and the repeal of the anti-closed shop laws in the 18 states. Also planned is an intensive membership drive to give the merger monopoly power over the economic and political life of the nation.

Every employer who gives in to union demands for a closed shop is "selling out" not only himself and his employees, but everyone else except the union leaders. There can be no middle ground on this question; anything less than a firm stand against the closed shop is equivalent to favoring it.

The Rural Zoning Problem

THE zoning problem is one of vital importance to every nonmetallic mineral producer, especially to those producing aggregates. In some areas the impact of zoning rules has not yet been felt, but in most states the whole future of these industries is tied in with the development and interpretation of zoning ordinances. Much has already been said and published on this subject, but it is doubtful that most producers are fully aware of the potential danger to their own businesses.

This entire problem of rural zoning was analyzed clearly and in detail in a paper presented at a recent meeting of the Ohio Sand & Gravel Association. The author, Richard E. Hole, a member of the law firm of Spidel, Staley & Hole of Greenville, Ohio, is well qualified to discuss this subject, having for many years represented clients plagued with this problem.

This paper so impressed executives of the National Sand & Gravel Association that copies were sent to its entire membership. In order that every producer may benefit from it, we are reprinting this article in full in this issue of PIT AND QUARRY.

Walter E. Trauffer

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Washington News Letter

Is Housing In Trouble?

Another P&Q Exclusive

By S. HERBERT UNTERBERGER

THIS question is being asked increasingly in Washington these days. If an unqualified answer could be given, officials concerned with housing would know what steps to recommend. The problem, of course, is that particularly in an election year, no one in the Administration wants anything to happen to the very important home construction industry; but, on the other hand, no one wants to take any drastic action unless it is called for.

The situation, as it stands right now, seems to look like this. Last year more than 1,300,000 new houses were built. But that figure has been falling ever since. By the middle of this year the rate was down to 1,100,000 new housing starts. And it looks as though the downward trend is continuing—down to the rate of 1,000,000 or even 800,000 starts.

On the other hand, the dollar volume of home construction is down, but not nearly so drastically. This means that the average new house is rising in value. Actually, very few low-priced houses are being built. By low-priced these days, we mean less than $15,000. The principal reason for this trend seems to be that there are very few credit-worthy buyers of low-priced houses. The G.I. market is not nearly what it used to be, and non-veterans are frequently too loaded up with other financial commitments—generally installment purchases—to be able to support additional payments for housing.

The builders, therefore, appear to be turning to houses in the $20,000 and higher bracket. Although they are building fewer houses, at least they seem to be making a larger profit on each house.

It may be that the saturation point has been reached or that the small, inexpensive house is obsolete. If that is the case, the situation is probably not very serious. However, it is equally likely that inadequate housing is again becoming out of reach for the average wage-earner. If so, the construction industry is pricing itself out of the market. It is headed for further contraction; its suppliers are headed for bad times, and its workers for unemployment.

The trends were clearly pointed up in a recent survey made by the Bureau of Labor Statistics dealing with new housing characteristics in 1955 and earlier years.

With respect to the size of houses, the survey found that back in 1950 nearly half of the new houses contained four rooms or less. In 1955, however, the six-room house dominated. In terms of floor area, the average 1950 house had less than 1,000 sq. ft., while the average 1955 house had closer to 1,200 sq. ft. In 1950, the two-bedroom house predominated; by 1955, more than two-thirds of the new houses in metropolitan areas had three bedrooms or more.

As might be expected, the increase in the size of the average new house was accompanied by an increase in the selling price. In 1955, the average selling price of a new two-bedroom house was $11,200, somewhat higher than in previous years, while the average selling price of a three-bedroom house was $13,900. Although building costs rose for all types of houses, the principal reason for a change in the average selling price was the shift to larger, more expensive houses. In 1950, for example, VA-guaranteed homes priced below $12,000 amounted to 70 percent of the total number appraised; in 1955, they amounted to only 30 percent of those appraised.

Not only were the 1955 houses larger than those of previous years; they were also better. A much larger proportion of them were of brick or other masonry construction, and more of them had basements, utility rooms, and fireplaces—the hallmarks of higher quality housing.

This up-grading in the housing market is one with which Washington officials are not familiar. They are not sure whether to keep hands off and let the trend develop or whether to attempt, by credit manipulation, to redirect the efforts of the home construction industry.

It is becoming perfectly apparent that middle- and low-income families are again finding themselves in the situation where they can not hope to own a new house, except in some cases where they have a fairly sizable equity in a relatively new small house which they can sell and then reinvest all the cash in the larger new house. But most of them will have to content themselves with an old house.

This places great emphasis on modernization and improvement of old houses.

Here, again, the housing officials must make a policy decision—whether to encourage modernization of old houses or construction of new ones. In either case, accessible credit at relatively cheap rates is required. At the moment, it seems to be easier to get credit for modernization than for purchasing. This may be the result of a conscious policy by which it has been decided that it is better economically to house people in areas where the investment in utilities has already been made, rather than to encourage them to move to new suburban areas where heavy development investment is required.

These decisions, however, are rarely based on such hard-headed economic calculations. They are more likely to be politically inspired. Accordingly, if the housing industry continues to languish, it will not be surprising if some attempts are made in Washington to give it a shot in the arm—before the November elections.

Pushbutton Crusher Plant To Be Built Near Macon, Ga.

Construction of a multimillion-dollar stone crushing plant near Macon, Ga., was recently begun by the Weston & Brooker Company, an aggregate-producing firm located in Columbia, S. C.

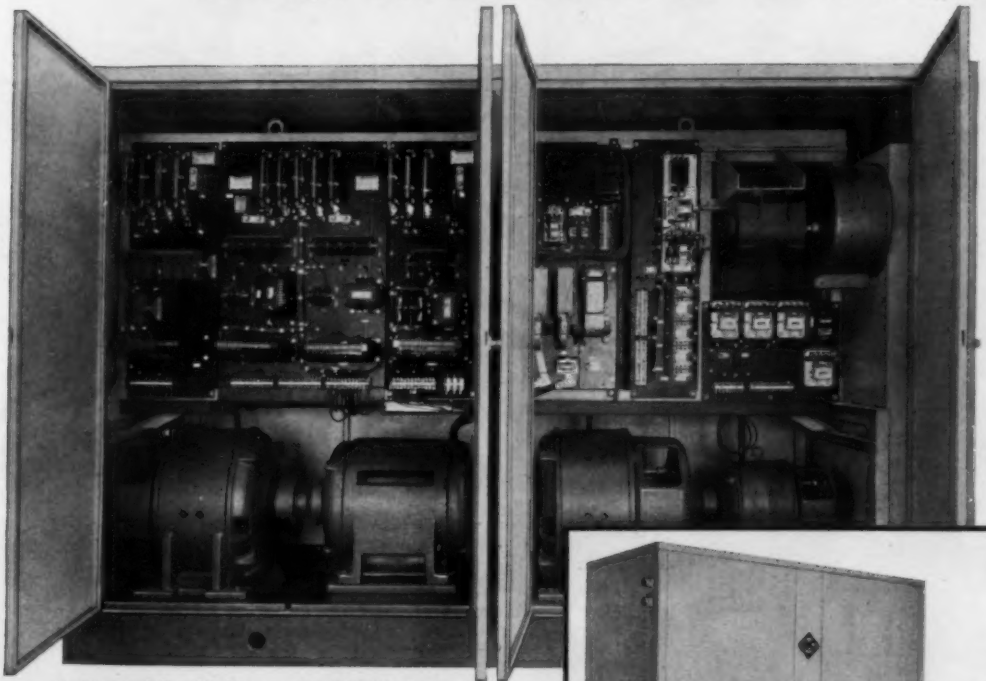
The pushbutton operation will have a capacity of 600 tons of material per hour when completed.

Weston & Brooker also operates aggregate plants at Camak and Granite Hill, Ga., and Cayce, S. C.

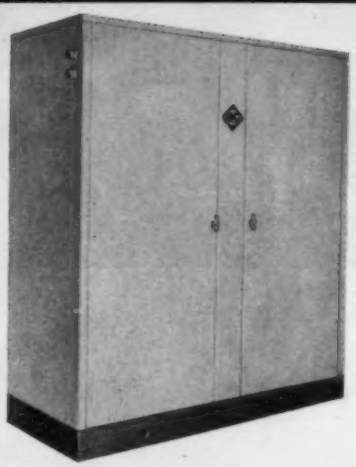
Permanente Cement Company has opened a contractor sales division office in San Francisco, Calif., where C. C. Moore will be in charge as division sales manager.

There's MORE dependable speed control

- high response
- high shock resistance
- no fragile parts
- no maintenance



Adjustable Voltage Multi-Motor Package Drive used with heat flattening and coating equipment. Unit features magnetic amplifier control of tension and strip speed.



Size 3 Adjustable Voltage Power Unit rated 30 hp, of standard construction. Magnetic amplifier excitation provided.

Every one of the design features of the Allis-Chalmers Adjustable Voltage Package Drive assures you an easy, dependable means of power conversion.

Key to Package Drive dependability is the use of a magnetic amplifier to excite the field of the power unit m-g set. Sturdy and simple, this amplifier has no moving parts to wear out . . . no fragile components to be affected by vibrations. AND — there's no wasteful "warm-up" time needed. At the turn of a dial, you get immediate speed control.

Cost-saving assembly

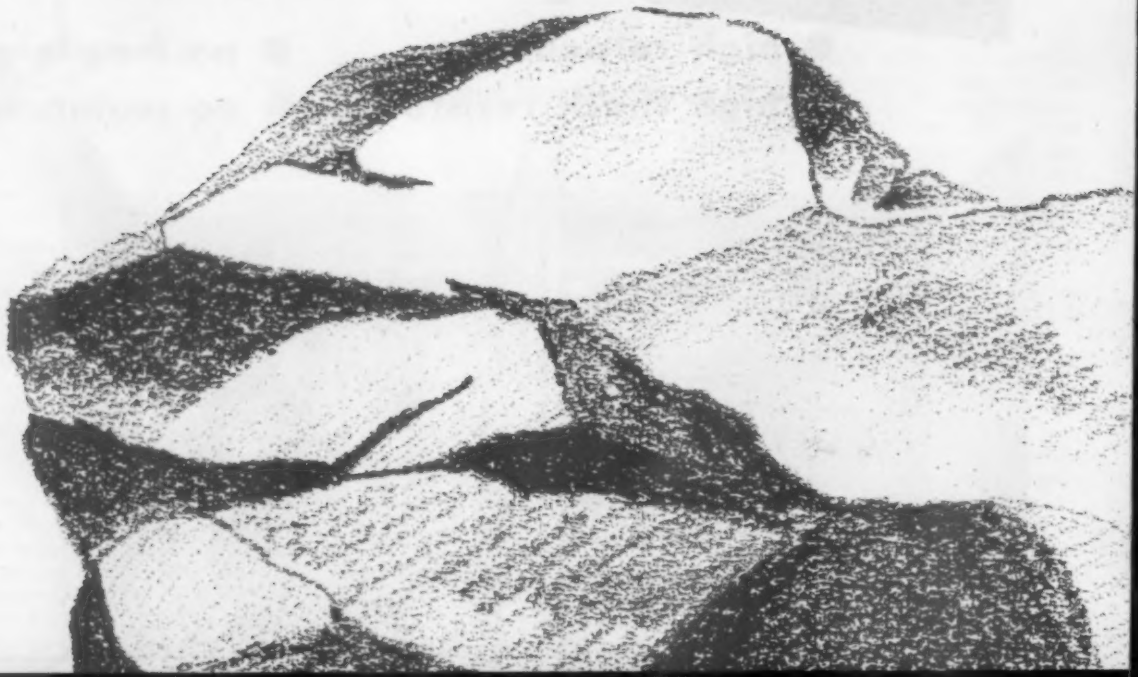
M-g set and control components are assembled in the power unit enclosure at the factory — saving you installation costs. Enclosures used for 30 through 200-hp units are completely collapsible and may be easily disassembled without loss of rigidity. Larger units have separately driven blowers to provide positive ventilation and pressure even when unit is idle.

Available in units from 5 to 200 hp, the package drive is ideal for any application requiring adjustable speed. Contact your nearby Allis-Chalmers sales office or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-5166

KVS BUILDS RUGGED MACHINERY FOR HEAVY DUTY WORK... PROVEN IN THE FIELD FOR OVER FIFTY YEARS.



M & M STONE PRODUC

heavy duty crushing equipment

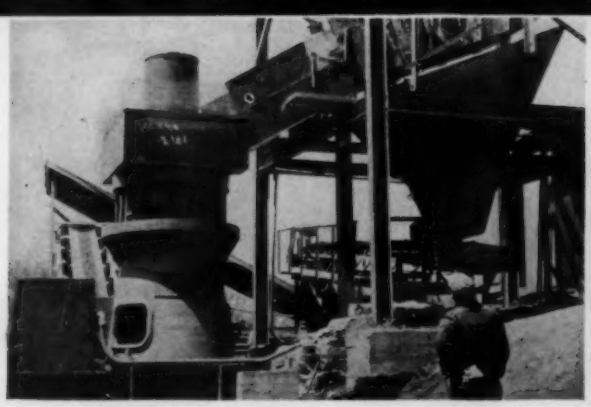
KENNEDY PRODUCTS

- Gyratory Crushers
- Swing Jaw Crushers
- Tube Mills
- Ball & Rod Mills
- Vibrating Screens
- Rock Feeders
- Air Swept Tube Mills
- Rotary Kilns
- Coolers, Dryers
- Preheaters, Deheaters
- Belts, Conveyors
- Pneumatic Transport Systems
- Waste Heat Boilers
- Pulverized Coal Firing Systems
- Steam Generators
- Asbestos Plants
- Complete Lime Plants
- Complete Cement Plants
- Complete Aggregate Processing Plants

General view of M & M STONE CO. at Harleysville, Pa. showing KVS Swing Jaw and Gyratory Crusher, Double Deck Vibrating Screens and Heavy Duty Rock Feeders in operation.

TS CHOOSES KENNEDY

on a basis of proven performance



KVS Gearless Gyratory Crusher No. 38½, Double Deck Vibrating Screens in operation at M & M STONE PLANT.

KVS Heavy Duty Rock Feeder serving KVS Swing Jaw Crusher at M & M STONE CO., Harleysville, Plant.

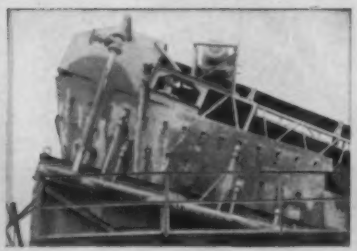
Send for Bulletin describing KVS Machinery and Equipment.

KENNEDY-VAN SAUN

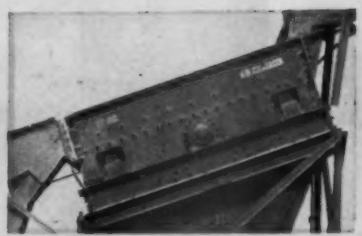
Manufacturing and Engineering Corporation • Two Park Avenue, New York 16, N. Y. • Factory: Danville, Pa.

PROFIT THROUGH ...WITH SIMPLICITY

A 4' x 12' and a 4' x 10' Triple Deck Model D Gyrating Screen, set in tandem, performs a final washing and sizing operation. The washed gravel is fed to five storage bins, so that any specification can be met by blending on the conveyor belt underneath these bins.



This Simplicity 5' x 14' Two Deck Model D Gyrating Screen takes its feed from the raw material stock pile via conveyor. All decks have washing sprays. The three products produced of sand and gravel are fed by conveyors to individual stock piles.



Aggregate is carried right from the pit to this Simplicity 3' x 8' Model BG Heavy Duty Scalping Screen. Fines are screened through to the conveyor below, while oversize is scalped to crusher.

ACCURATE SIZING GYRATING SCREENS

4,500 tons of aggregate a day is classified by four Simplicity screens at Holly Sand and Gravel, near Holly, Michigan

Working two shifts of 9 hours each, the Holly Sand and Gravel Company is daily processing 4,500 tons of aggregate, and the firm's General Manager expects to exceed this total in the near future. All this material is sized on four Simplicity screens. Simplicity Model D Gyrating Screens and a Model BG Scalping Screen efficiently and accurately classify the aggregate into grades 10A, 6A, Pea Rock, Torpedo Sand, and Mason Sand. This fast and accurate sizing is typical of the performance of Simplicity Screens throughout the aggregate industry. In addition, a 3' x 6' Model C Single Deck Screen has recently been installed to produce 100% clean Pea Pebbles, by eliminating the buckshot. The Simplicity Gyrating Screen is the original type of mechanically vibrated screen using the counterbalanced eccentric shaft. The counterbalance is machined directly on the shaft, thus giving positive action with perfect smoothness.

Simplicity Gyrating Scalpers are heavy-duty machines built on the same basic principles as the Gyrating Screens, but with a grizzly deck to scalp off the oversize rock. These units are designed to withstand terrific impact. They perform two jobs at once by feeding the oversize into a crusher, and screening the fines.

Wherever you need fast, efficient scalping, screening, or feeding in your aggregate operation, Simplicity equipment can be a big help to you . . . write us today for complete information.

Simplicity
TRADE MARK REGISTERED

ENGINEERING COMPANY • DURAND 12, MICHIGAN

SALES REPRESENTATIVES IN ALL PARTS OF THE U.S.A.
FOR CANADA: Simplicity Materials Handling Limited, Guelph, Ontario
FOR EXPORT: Brown and Sites, 50 Church St., New York 7, N. Y.

INSPECTION WITHOUT REJECTION. Under this close scrutiny, USS Lorain Rolled Plate Lining passes every test—shows it is ready to take the toughest kind of punishment.

SEE The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS LORAIN ROLLED PLATE LININGS *and* USS GRINDING BALLS

6-2280

UNITED STATES

SHOWN DURING CONSTRUCTION are seven of the eight new ball mills that will bring Lone Star's annual capacity at Nazareth, Pa. to 3,600,000 bbls.

For its enlarged plant . . .

Lone Star Cement

<u>again</u> chooses

USS Lorain Rolled Plate Lining

Lone Star Cement Corporation is one of the world's largest Portland cement producers. Now, at Nazareth, Pennsylvania, enlarged facilities are rapidly nearing completion which will bring their plant up to an annual capacity of 3,600,000 bbls.

For this huge new addition, Lone Star chose USS Lorain Rolled Plate Linings for their new grinding units. This selection was based on past performance in Lone Star's other plants. It's a tribute to the wearing qualities and design of these extra-tough linings.

This extra toughness stems from the use of high-carbon rolled steel in the liner plates and alloy rolled steel in the lift bars. Each lining is custom made to fit the exact requirements of a particular mill.

The heat-treated lift bars have a marked hardness differential from the liner plates; this retains lift for the life of the lining. The result is constant grinding efficiency, maintenance of output and, above all, reduced grinding costs.

The lining design selected by Lone Star for their new Nazareth mills was the USS Lorain "staggered" type of lining, which will greatly reduce impact and vibration in any grinding mill.

Like Lone Star, specify USS Lorain Rolled Steel Plate Lining if you are interested in the above improvements. You'll "stay" with it, too. For expert engineering assistance on any grinding problem, just write to Specialty Products Sales, United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

S T E E L

88% of all Aggregate and Bituminous Plants on Kansas Turnpike

28 OUT OF 32 PLANTS DEPEND ON CEDARAPIDS for the equipment that can best meet exacting turnpike specifications. Along the 236 miles of Kansas Turnpike, 25 aggregate producing plants are turning out over 12,000,000 tons of rigidly specified base rock, granular subbase, sand, gravel, etc. *All but two of these plants use Cedarapids crushing or screening equipment!* Out of seven bituminous mixing plants supplying asphaltic concrete, *five are Cedarapids!*

THE NEW HIGHWAY PROGRAM

. . . with its 40,000-mile interstate system built to increasingly rigid specifications, will see more and more contractors turning to Cedarapids for equipment that's been proved on the Kansas Turnpike for maintaining a profitable production pace in the toughest production conditions.

Five G60's Supply Most of The Asphaltic Concrete

Five big Cedarapids G60 Bituminous Mixing Plants are meeting exacting KTA specifications with the volume demanded by an undertaking of this size. The fact that five of the seven bituminous mixing plants on the Kansas job are Cedarapids Model G60's indicates how contractors feel about this all-automatic plant's thorough mixing and accurate batching, ability to take up to 7500-lb. batches, and profitable production of up to 180 tons per hour.

RENO CONSTRUCTION CO. PRODUCES 250 TONS PER HOUR

Using a Cedarapids Portable Double Impeller Impact Breaker Primary, a scalping screen unit, and a Portable Hammermill Secondary to produce KTA specification aggregate, Reno Construction Company's production ranges between 200 and 250 tons per hour. The Overland Park, Kansas, contractor is operating two Cedarapids Unitized Plants near Aikman and a G60 Bituminous Mixing Plant near Chelsea. Reno owns many other Cedarapids portable units as well as stationary plants.

SEE YOUR CEDARAPIDS DISTRIBUTOR FOR HELP WITH YOUR TURNPIKE PROBLEMS

The Cedarapids Line of Equipment Includes:

PORTABLE AND STATIONARY CRUSHING, SCREENING AND WASHING PLANTS FOR STONE, GRAVEL AND SAND • BELT CONVEYORS • VIBRATOR AND REVOLVING SCREENS • FEEDERS • HAMMERMILLS • DOUBLE IMPELLER IMPACT BREAKERS • BATCH TYPE AND CONTINUOUS TYPE BITUMINOUS MIXING PLANTS • DRIERS • DUST COLLECTORS • VIBRATING SOIL COMPACTION UNITS • MOTORIZED HEAD PULLEYS

Built by Iowa . . . Sold the World Over

use CEDARAPIDS EQUIPMENT

Difficult Specification Problems Solved by Contractor Ingenuity and CEDARAPIDS Versatility

Meeting the toughest turnpike specs yet was complicated by extremely difficult crushing conditions. Some native limestone, with 8% moisture content, tends to pack rather than crush. In some quarries, clay topsoil in the material makes it difficult to meet specified PI limits. A common problem was getting rid of the high percentages of dirt and objectional fines encountered.

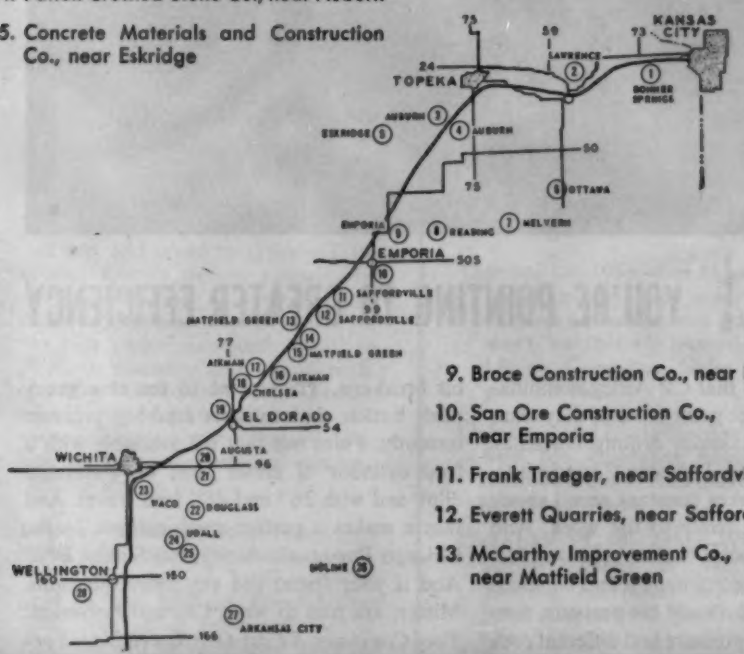
To lick these problems, many contractors turned to *breaking*, instead of crushing, the saturated, rubbery rock with Cedarapids Double Impeller Impact Breakers . . . wasting contaminating fines before primary crushing by use of Cedarapids vibrating grizzlies discharging onto waste conveyors . . . using Cedarapids Portable Screening Units or Screens ahead of secondary crushers to scalp off objectionable fines . . . combining flexible Cedarapids washing equipment to produce clean aggregate.

Kansas Turnpike Aggregate Specifications

Screen	Sub-Base Rock (% Passing)	Base-Course Rock (% Passing)*
2 in.	100	100
1½ in.	100-75	100-70
1 in.	100-60	100-60
½ in.	95-45	
⅜ in.		95-39
No. 4	80-25	75-25
No. 10	65-17	55-17
No. 40	40-8	30-8
No. 200	10-0	10-0

CEDARAPIDS OWNERS ON THE KANSAS TURNPIKE

1. Loring Quarries, near Bonner Springs
2. B. L. Anderson, Inc., near Lawrence
3. Weaver Construction Co., near Auburn
4. Patton Crushed Stone Co., near Auburn
5. Concrete Materials and Construction Co., near Eskridge
6. Concrete Materials and Construction Co., near Ottawa
7. Dusenbury Quarries, near Melvern
8. Nelson Brothers, near Reading
9. Broce Construction Co., near Emporia
10. San Ore Construction Co., near Emporia
11. Frank Traeger, near Saffordville
12. Everett Quarries, near Saffordville
13. McCarthy Improvement Co., near Matfield Green
14. McCarthy Improvement Co., near Matfield Green
15. Dillon Stone Company, near Matfield Green
16. Reno Construction Co., near Aikman
17. Reno Construction Co., near Aikman
18. Reno Construction Co., near Chelsea
19. George Meyers Inc., near El Dorado
20. Badger Material Co., near Augusta
21. Amis Construction Co., near Augusta
22. Carr Rock Products Co., near Douglas
23. Imperial Paving Co., near Waco
24. H. D. Youngman Construction Co., near Udall
25. Anderson Oxandale Crushed Stone Co., near Udall
26. Concrete Materials and Constructio Co., near Moline
27. San Ore Construction Co., Arkansas City
28. Peter Kiewit Sons' Co., near Wellingto



IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U. S. A.

That's right mister! YOU'RE POINTING TO GREATER EFFICIENCY

When you point to that CP Airleg combination, Mister, why not point out that they team up to give the maximum drilling efficiency obtained when using Tungsten-Carbide bits. And that the leg takes constant recoil shock yet holds the drill firmly to the work. And while you're at it, point to the exclusive pressure release type control handle and balanced feed leg that assure steady bit pressure even under variable line pressure and different rock formations – eliminate "slapping" and reduce bit breakage. Then point to the emergency push button that releases feed-leg pressure instantly. Point out that it's available with a feed cylinder of either steel or aluminum alloy and with 36″ and 48″ feed travel. And that it makes a perfect combination . . . the Chicago Pneumatic Airleg and Sinker Drill! And if your friend has any more questions, Mister, ask him to write *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, New York.*

Chicago Pneumatic

News of the Industry

International Min. & Chem. Opens Three New Plants In Industrial Minerals Div.

Louis Ware, president, International Minerals & Chemical Corporation, Chicago, Ill., has announced the opening of three new plants in the corporation's Industrial Minerals Division.

Blue Mountain, Ont., is the location of a $1,500,000 mine and plant for the production of nepheline syenite, an important ingredient in the manufacture of glass. With an annual capacity of 100,000 tons, the Blue Mountain plant helps make International one of the largest suppliers to the ceramics industry.

International has also opened a new mica beneficiation plant at Greenville, Tenn. The $500,000 plant has a 64-t.p.d. capacity.

In Los Angeles, Calif., International recently opened its first perlite grinding unit. New plans now provide for doubling the size of this plant which, under a patented process, yields perlite in a form not previously available.

Huron Portland Cement Co. Expanding Oswego Facilities

Scheduled for completion early this fall is a $150,000 addition to the Huron Portland Cement Company's plant at Oswego, N. Y., consisting of four new storage bins and loading out equipment.

These additional facilities will increase Huron's storage capacity by about 70,000 bbl., or approximately double the present capacity. Each of the bins under construction will be 32 ft. in diameter and 126 ft. high. Combined capacity of the four units, which will be joined together, will exceed that of the existing six. The bins are to be of reinforced concrete construction.

Lehigh Augments Reserves With 2,000-Acre Purchase

The purchase of 2,000 acres of land in the Bedford Creek-Camp Mills area at an estimated cost of $250,000 will be completed soon by the Lehigh Portland Cement Company for future development.

The land involves 19 owners and 28 separate parcels in the Town of Hounsfield, N. Y. Purchase of land has already been made from 15 owners, and negotiations with the remaining four land owners are pending.

P. A. Groll, executive vice-president of the Lehigh Portland Cement Company, reported that "no definite plans" for the development of the Bedford Creek-Camp Mills area have been formulated. He gave as the primary reason for Lehigh's acquisition of the property the necessity of establishing a reserve quarry to supply the firm's Buffalo plant with limestone materials.

Officials of the Calaveras Cement Company recently announced the opening of a 5,000-bbl. capacity bulk cement transfer plant in San Leandro, Calif., to facilitate deliveries to the construction industry in the bay area and northern California.

Ore Carrier's Maiden Run Completes Natl. Gypsum's $25,000,000 Expansion Plan

The arrival of the 16,500-ton ship, the *Melvin H. Baker,* at Philadelphia recently marked the completion of a five-year, $25,000,000 expansion of the National Gypsum Company's Atlantic Coast operations.

On her maiden voyage, the *Baker* carried 12,000 tons of gypsum from the company's 12,000-acre open pit mine in Nova Scotia for processing at its newly-opened multimillion-dollar plant on the Delaware River.

The *Baker,* called the world's largest and fastest gypsum ore carrier, and her two sister ships, the *Lewis H. Sanderson* and the *William M. Currie,* are expected to cut shipping costs by about $900,000 yearly.

Named after the founder and present chairman of the company, the 525-ft. vessel is powered by twin 7,300-hp. diesel engines.

Coming Events

October 1-3, 1956—Pebble Beach, Calif. National Sand and Gravel Association and National Ready Mixed Concrete Association directors' meetings. Del Monte Lodge.

October 1-4, 1956—Los Angeles. Metal mining and industrial minerals convention and equipment exhibition, American Mining Congress. Shrine Exposition Hall.

October 10-12, 1956—Springfield, Mo. Operating meeting, National Lime Association. Kentwood Arms.

October 17-19, 1956—White Sulphur Springs, W. Va. Fall meeting, National Industrial Sand Association. The Greenbrier.

October 22-26, 1956—Chicago. 44th National Safety Congress and Exposition. Conrad Hilton, Congress, Morrison, and La Salle hotels.

November 8-10, 1956—Hershey, Pa. Northeastern Mining Branch Conference. Lehigh Valley Section, American Institute of Mining, Metallurgical and Petroleum Engineers, host. Hotel Hershey.

January 15-17, 1957 — Miami Beach. 40th annual convention, National Crushed Stone Association, American Hotel.

January 28-February 2, 1957 — Chicago. 55th annual convention, American Road Builders' Association, Convention and Road Show. National Amphitheater.

February 11-14, 1957 — Los Angeles. 41st annual convention, National Sand and Gravel Association. Statler Hotel.

Building Contracts in July 5% Below July, 1955— 7-Month Totals Soar

Contract awards for future construction in the 37 eastern states in July were 5 percent below July of last year, according to F. W. Dodge Corporation. The total of $2,148,-559,000 was the second-highest ever recorded in July, however, exceeding the third-highest July figure by 17 percent.

The cumulative total of awards for the first seven months of 1956 reached a record high of $15,347,-518,000, an increase of 8 percent over the same period in 1955.

Awards of $543,308,000 in the heavy engineering category, the highest July in Dodge history, were 29 percent greater than a year ago. In the other major construction categories, non-residential building at $847,332,000 was 5 percent below the figure for July, 1955; and residential building at $757,919,000 was 21 percent below the July, 1955, total.

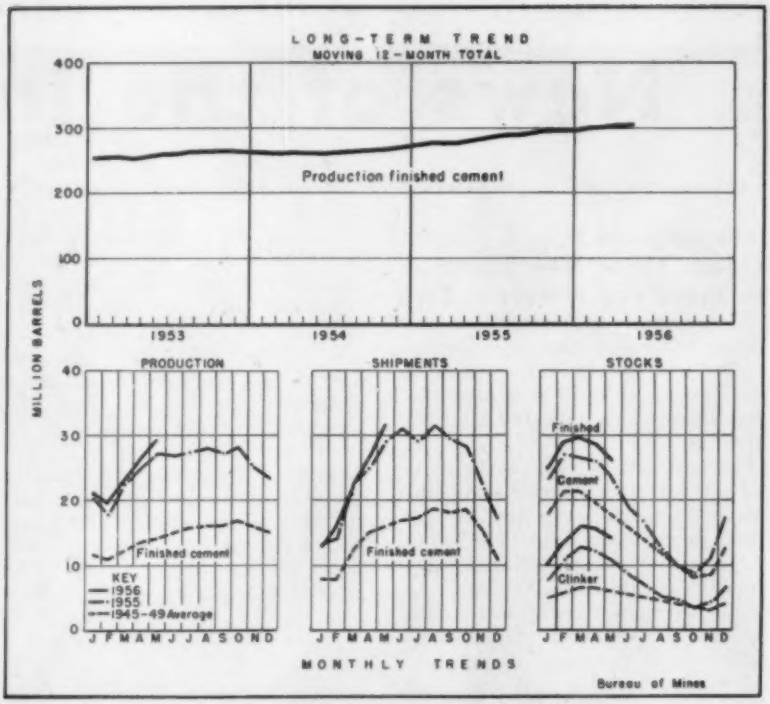
Major construction categories set new all-time records for the first seven-month cumulative totals. Individually, the totals are as follows: non-residential at $5,455,014,000, up 9 percent; residential at $6,456,587,-000, up 1 percent; and heavy engineering at $3,435,917,000, up 22 percent.

Commenting on the current situation, Dr. George Cline Smith, vice-president and economist for F. W. Dodge Corporation, said:

"Contract awards for June and July were slightly below last year's record totals, marking the first time since mid-1953 that two months in a row have declined. A general tendency for the figures to level off has been apparent in the last few months, but this is not unexpected. In outlook statements published last fall we and other observers took the position that it was unreasonable to expect sharp increases like those recorded in 1955 to continue. . .

"But it should be emphasized that awards are still at enormously high levels. The current figures are far higher than those for the middle months of any year except 1955. And the totals for the first seven months of this year set a new all-time high, 8 percent ahead of last year's record.

"Construction activity based on these contract awards will undoubtedly reach new heights this year, with enough emphasis on business and government investments in new facilities to offset a softening in residential building."



SUMMARY—Production of finished portland cement in April, 1956, as reported to the U. S. Bureau of Mines, totaled 26,134,000 bbl., an increase of 5 percent over the 24,818,000 bbl. produced in April, 1955. Mill shipments in April, 1956, totaled 27,087,000 bbl., an increase of 8 percent over the 24,993,000 bbl. shipped in April, 1955. Stocks of 28,678,000 bbl. of finished portland cement on hand April 30, 1956, were 10 percent more than the 26,106,000 bbl. on hand April 30, 1955. Clinker production during April, 1956, totaled 26,047,000 bbl., an increase of 7 percent over the April, 1955, figure.

In May, 1956, 29,606,000 bbl., were produced, an increase of 10 percent over May, 1955. Mill shipments in May, 1956, totaled 31,787,000 bbl., an increase of 9 percent over May, 1955. Stocks of 26,198,000 bbl. of finished portland cement on hand May 31, 1956, were 11 percent more than the stocks on hand May 31, 1955. Clinker production for May, 1956, totaled 27,-835,000 bbl., an increase of 8 percent over the May, 1955, figure.

PRODUCTION—One hundred fifty-eight (158) plants in 37 states and Puerto Rico reported production in both April and May.

Clinker figures for 1955 and 1956 are not strictly comparable to those of 1954 and earlier years because producers are now asked to report clinker in terms of the number of 376-lb barrels of finished portland cement which could be produced from the quantity of clinker in question, whereas previously the unit of measure was the 376-lb. barrels of clinker.

High-early-strength portland cement produced in April, 1946, totaled 852,000 bbl., a decrease of 17 percent from the 1,031,000 bbl. produced in April, 1955. In May, 1956, 846,000 bbl., were produced, an 8 percent increase over the 783,000 bbl. produced in May, 1955.

Prepared masonry cement produced in April, 1946, totaled 1,293,000 bbl., a 4 percent increase over the April, 1955, figure — 1,247,000 bbl. In May, however, the 1956 total — 1,384,000 bbl., resulted in a 10 percent decrease from the 1,535,000 bbl. produced in 1955.

SHIPMENTS—Mill shipments of finished portland cement for April, 1956, totaled 27,087,000 bbl., 8 percent higher than in April, 1955. In May, 1956, shipments totaled 31,787,000 bbl., 9 percent higher than in May, 1955. The figures for mill shipments in 1955 and 1956 are not strictly comparable with mill shipments of 1954 and earlier years because they no longer include the number of barrels of finished portland cement used in the manufacture of prepared masonry cement.

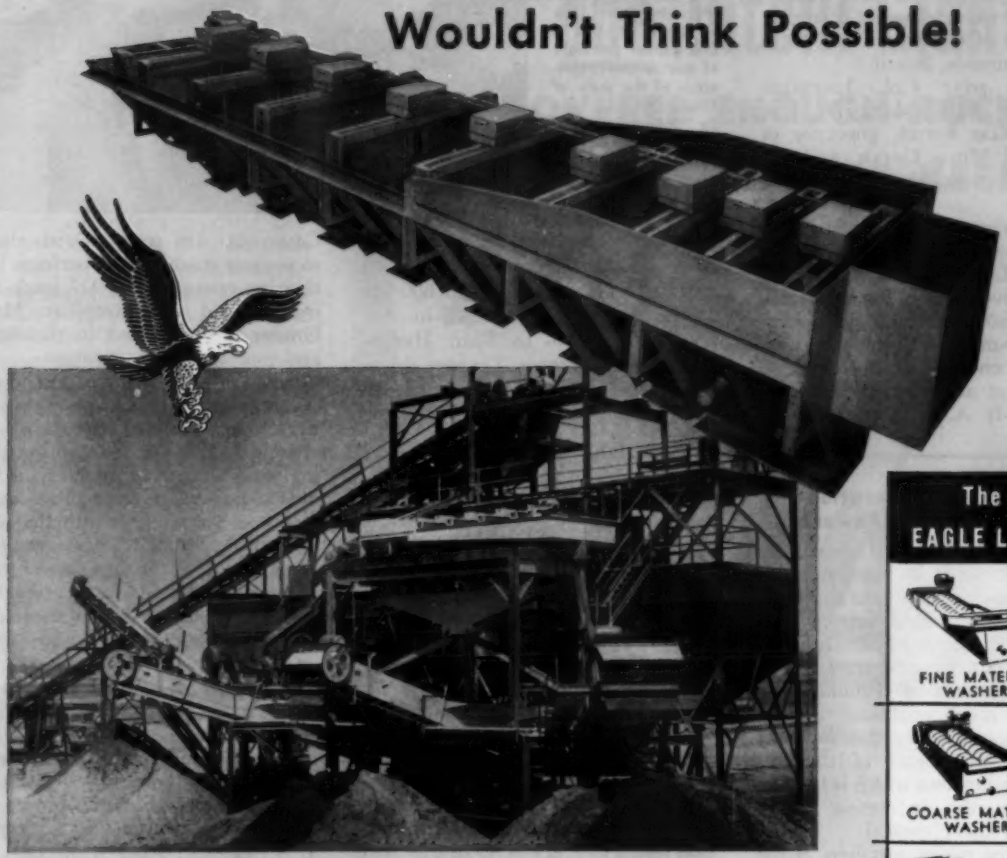
In April, 1956, 14 districts showed an increase in shipments over April, 1955; 6 showed a decrease. The greatest increases were in the Tennessee, Michigan, Iowa, and southern California districts, and the greatest decreases were in the northern California and western Missouri-Nebraska-Oklahoma-Arkansas districts. In May, 1956, 17 districts showed an increase in shipments over May, 1955; 3 showed a decrease. Increases were greatest in the southern California and Texas districts, and decreases in the western Missouri-Nebraska-Oklahoma-Arkansas district.

April, 1956, shipments of high-early-strength portland cement totaled 1,059,000 bbl., a 5 percent increase over April, 1955, and most of the shipments were from Pennsylvania, Maryland, Michigan, and Alabama. May, 1956, shipments of high-early-strength totaled 1,150,000 bbl. a 4 percent increase over May, 1955, most shipments coming from Pennsylvania, Maryland, New York, Maine, and Michigan.

Shipments of prepared masonry cement in April, 1956, totaled 1,449,000 bbl., up 16 percent over April, 1955. In May, 1956, shipments of prepared masonry cement amounted to 1,577,000 bbl., a 2 percent increase over May, 1955.

STOCKS—Mill stocks of 28,678,000 bbl. of finished portland cement were on hand April 30, 1956, 10 percent more than on April 30, 1955. Stocks of clinker on hand April 30, 1956, totaled 15,844,000 bbl., a 31 percent increase over the April 30, 1955, figure. Mill stocks of 26,198,000 bbl., of finished portland cement were on hand May 31, 1956—11 percent more than on the same date in 1955. On May 31, 1956, stocks of clinker on hand totaled 14,007,000 bbl., an increase of 32 percent over the May 31, 1955, figure.

The EAGLE Water Scalping-Classifying Tank Gives You Classification You Wouldn't Think Possible!



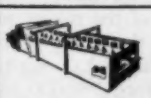
THE EAGLE Complete Washing-Classifying-Dehydrating Section at the eastern aggregate plant shown, has a 24′ tank equipped with 7 automatic, power-operated bleeder valves. Pit run sand is segregated into 7 distinct classifications, each flowing from one of the 7 valves. "Splitter" gates below each valve, in conjunction with the Multi-Cell Collecting-Blending Flume below the tank, permit directing of any percentage from each valve to any of the three Eagle Screw Washer-Classifier-Dehydrators. Or, any percentage from any valve can be wasted. Complete flexibility to produce any gradation—or variety of gradations—material to meet specifications.

You can increase the efficiency of your present Eagle Fine Material Washer or Washers—or other make—by installing an Eagle Water Scalping-Classifying Tank—whether yours is a dry pit operation, as shown, or a pumping operation. Send for the facts in Catalog 55.

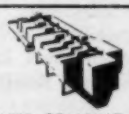
The EAGLE LINE

FINE MATERIAL WASHERS

COARSE MATERIAL WASHERS



LOG WASHERS



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Cimento Caue Plant Opened with Ceremonies At Belo Horizonte, Brazil

Government officials and American industry representatives attended the recent ceremonies marking the opening of Cimento Caue plant in Belo Horizonte, Brazil.

Included were Col. Juventino Dias, owner of the plant; Dr. Jose Francisco Bias Fortes, governor of the state of Minas Gerais, and Dr. Juscelino Kubitschek, president of Brazil.

Erling Winsnes, former manager of Allis-Chalmers South American sales, and Lewis Fry, A.-C. factory representative at Sao Paulo, Brazil, were also present at the launching of this 300-metric-ton-per-day wet-process cement mill.

Equipment at the mill includes a 10- by 340-ft. A.-C. kiln; a 4½- by 70-ft. air-quenching cooler; a 7- by 28-ft. and an 8- by 29-ft. Compeb grinding mill with 500 and 800-hp. drives, respectively; a 42-32-in. A-1 jaw crusher, a 5- by 30-in. Hydrocone crusher, screens, Texrope drives and other auxiliary equipment. Expansion plans are under way.

Among those participating in opening ceremonies at the new Cimento Caue plant were Colonel Juventino Dias (reading), owner of the company; Dr. Jose F. Bias Fortes (at right of microphone), governor of the state of Minas Gerais; and Dr. Juscelino Kubitschek (at right of Dr. Fortes), president of Brazil.

Difficult Sulphur Operation Facilitated by Diesel Power

In southern Mexico, where this country narrows to its smallest width before broadening out into the Central America region, diesel power is causing new sulphur industries to rise in the undeveloped terrain.

In the Isthmus of Tehuantepec, some 170 miles southeast of the city of Veracruz, lies the town of Minatitlan, the center of the sulphur-producing area which is helping to alleviate the increasing world demand for this chemical.

One of the major suppliers in the area is the plant of Cia. de Azufre Veracruz, S.A., which is engineered to produce 300,000 tons of sulphur per year. With small additional capital investment, this capacity can be increased to over 500,000 tons.

Three brothers, Lawrence, Ashton, and William Brady, are largely responsible for the introduction of the sulphur industry into Mexico. Having started out in the oil business, they discovered sulphur traces in the logs of the Isthmus oil wells. They acquired leases, and wildcatted three wells, the third of which was a producer. They subsequently sold a good number of their leases, but retained the Cia. de Azufre Veracruz, S.A. The Bradys recently sold their interest in the company to Bear, Stearns & Company, and the Hudson Engineering Corporation. This company alone has exploration and exploitation rights in 7,414 acres in this area.

Because of its geographic location, this region lacks the physical development found in more progressive areas. Sulphur found in the porous limestone would ordinarily be difficult to obtain, but diesel power makes the work possible and profitable.

Cia. de Azufre Veracruz uses two Caterpillar D6 tractors with dozers to pioneer roads and to perform land clearing operations. A D7 track-type tractor and a Caterpillar Motor Grader are also used in pioneering and maintenance operations.

Since sulphur is found in the porous limestone, the company uses the Frasch process for extracting the chemical. This method requires drilling wells similar to those in oil field operations, and forcing super-heated water under pressure into the wells. The sulphur is melted and freed from the limestone. It is then forced to the surface in liquid form, piped to transportation facilities, allowed to solidify in storage vats, and is then crushed, weighed, and loaded into ships, railroad cars, or trucks for delivery.

Two shovels—a Bucyrus Erie and a P & H—are used in the operation, and both are powered by Caterpillar diesel engines. Electric power was furnished through a Caterpillar D315 Electric Set.

Consolidated Virginia Mining Company, now in the process of reactivating its mining operations at Virginia City, Nev., has opened an administrative office in San Francisco, Calif.

Through dense foliage and undergrowth in southern Mexico, a diesel bulldozer carves out a road to serve a sulphur operation.

Thatched bungalows serve as living quarters for workers in the sulphur industry in the state of Veracruz, Mexico.

A.S.T.M. Issues Handbook Of New Specifications For Aggregates, Concrete

A.S.T.M. Standards on Mineral Aggregates and Concrete (C-9, D-4) includes the latest editions of standard and tentative specifications, test methods, and definitions of terms pertaining to mineral aggregates, concrete and selected highway materials. The publication is sponsored by Committee C-9 on Concrete and Concrete Aggregates and Committee D-4 on Road and Paving Materials, and includes all standards for concrete and concrete aggregates prepared by Committee C-9, but only those for selected non-bituminous highway materials or those involving aggregate gradings or tests developed by Committee D-4. It also contains pertinent specifications for cement under the jurisdiction of Committee C-1 on Cement, and references specifications on concrete reinforcement bars prepared by Committee A-1 on Steel.

This 360-page book contains 98 standards in their latest forms—56 test methods, 33 specifications, 7 definitions of terms, and 2 recommended practices. Of the above, 27 were adopted in 1955.

Subjects covered include specifications and methods of test for aggregates (crushed stone, crushed slag, gravel, and lightweight); ready-mixed concrete; air-entraining admixtures; methods of test for air content of concrete, compressive strength, flexural strength, freezing and thawing, slump test; brick and block pavement materials; concrete curing material; expansion joint fillers: and cement.

This publication may be obtained from A.S.T.M. headquarters, 1916 Race Street, Philadelphia, Pa., at $3.75 per copy.

New Slurry Test Laboratory Indicates Equipment Needs

With a new slurry test laboratory —first of its kind to be developed— spokesmen for the Morris Machine Works, Baldwinsville, N. Y., say that it will be possible to determine in advance friction losses and critical carrying velocities of particular slurries. Knowledge of these factors in advance will enable the firm to recommend more accurately the most efficient pump and pipe sizes to handle a particular slurry.

Several types of slurries have been run through the laboratory, including cement, limestone, lime hydrate, coquina shell, fly ash, clay, iron ore tailings, foundry slag, coal, culm and sulphide tailings.

AT GRAHAM BROS. CATALINA QUARRY

one intelli-Giant

UNCOVERED ENOUGH ROCK IN A FEW WEEKS TO KEEP OPERATION RUNNING A FULL YEAR!

"Excellent performance record," reports Graham Bros., even though their Intelli-Giant uses corrosive salt water from the nearby Pacific Ocean.

To mine a very steep bank, Graham Bros. first had to remove several feet of clay-laden soil, loaded with large boulders and thick brush growth. An Intelli-Giant was secured and set to work.

Operating at 160 psi and 850 gpm, the Intelli-Giant washed away burden and undercut boulders with such speed that in a few weeks enough rock had been uncovered to keep the operation running for a full year.

Interested in speeding up your quarrying operation? Then by all means investigate the Chiksan Intelli-Giant.

For more information write Dept. 2212

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NOW—PRECISION-MADE

Unique Optical Comparator Assures Accurate

As the first to apply the technique of micrometric projection to the manufacture of wire screen cloth, Hewitt-Robins can now meet the most exacting specifications every time. With the use of this Optical Comparator, an unusually high degree of accuracy can be obtained because all measurements and comparisons are made on a greatly enlarged image rather than on the object itself. There is no direct contact with any part nor can there be any deformity caused from measuring pressure.

The actual wire sample is projected on a master chart with such magnification that the operator can instantly see and correct the smallest variation in the specified crimp. As a result, the crimping machine can be adjusted to three decimal places to obtain maximum uniformity of product.

This is one more special Hewitt-Robins technique for assuring you the finest in wire screen cloth for every sizing, separating or screening operation. Hewitt-Robins wire screen cloth is tougher . . . resists extreme abrasion . . . lasts longer. Every piece is tightly woven with precisely accurate openings and will provide you with higher operating efficiency and lowest cost per ton.

Hewitt-Robins screen cloth is obtainable in a wide variety of weaves in plain steel, spring steel, oil-tempered steel, stainless steel and many other alloys . . . is carried in stock in both Super and Gyraloy grades, 3/16" openings and coarser.

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STAMFORD,

SCREEN CLOTH

Quality Control

New Optical Comparator for testing the crimp of wire screen cloth compares samples with master chart. Projected image has been magnified 10 times for precision comparison by D. K. Wallace, Superintendent of Hewitt-Robins Square Mesh Department.

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Hewitt-Robins Vibrating Screens are manufactured in a variety of styles and a wide range of sizes for every need of industry.

GYREX SCREENS

General-purpose, positive-stroke, 4-bearing screen with amazing versatility of application and an unsurpassed record for stamina in service.

STYLES M AND MS VIBREX SCREENS

Full-floating, unbalanced, pulley-type, 2-bearing screen. Offers sharp sizing of a wide variety of materials at low cost.

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General-purpose screen applicable to a wide variety of screening operations. Wide range of sizes for suspended mounting.

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For fine screening operations (up to 100-mesh in some cases). Highly effective circle-throw screening action.

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Exclusive 3-way elliptical motion for sharpest sizing and most effective dewatering. Horizontal-operating flat screens.

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Lehigh Section of A.I.M.E. To Be Host to Conference Of N.E. Mining Branch

The Northeastern Mining Branch Conference will be held at Hershey, Pa., November 8 to 10, with the Lehigh Valley Section, American Institute of Mining, Metallurgy and Petroleum Engineers entertaining. Technical sessions will be held each day, and the industrial minerals technical session has been scheduled for Friday afternoon. Three field trips have been planned.

Sessions will be held in the Hotel Hershey. Fifteen papers have been scheduled for the well-balanced technical program.

Advance registration and hotel reservations will be taken about September 1. W. B. Stephenson is general chairman of the conference. D. S. Lyons is chairman of the Lehigh Valley Section.

The seventh annual California statewide meeting of the Governor's Industrial Safety Conference will be held on February 7 and 8, 1957, at the Biltmore Hotel, Los Angeles.

Another new BRUNNER & LAY 6" CARBIDE BIT ... the HOLE-MASTER

Two air holes, and wide chip channels, permit this down-the-hole bit to discharge more and larger chips—to work in rock, not its own cuttings. Get the complete details—we'll be glad to demonstrate.

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Production Drilling Blasting To Receive Major Emphasis At U. of Minn. Symposium

On October 11, 12, and 13 the sixth annual symposium in the drilling field will be presented at Minneapolis by the University of Minnesota through the co-operating services of the School of Mines and Metallurgy of its Institute of Technology and the Center for Continuation Study. The planning committee has decided to depart somewhat from its previous consideration of exploration drilling and to direct the inquiry to production drilling and blasting.

The program will begin with a discussion of the principles of drilling and blasting; and on the second day drilling and blasting practice in the Lake Superior area will be discussed. Addresses covering the blasting of hard rock include the following: *Theory and New Developments in Explosives for Blasting* by Dr. Melvyn Cook, Utah University; *Theory of Rock Fragmentation in Blasting* by C. W. Livingston, president, Barodynamics, Inc.; and *Use of Seismic Methods to Improve Blasting Practice* by Dr. L. Don Leet, Hammond University.

During the session to be devoted to other hard rock properties Nelson Severinghaus, vice-president and general manager, Consolidated Quarries Corporation, Decatur, Ga., will discuss quarry operation.

As usual, the meeting is open to mining engineers, mine operators, drilling contractors, and suppliers, and others interested in the subject matter. Because of the unusually high expense of this meeting, the fees will be as follows: registration, $3; tuition, $12; the proceedings are included, as usual. Further information and additional application blanks may be obtained from the director, Center for Continuation Study, University of Minnesota, St. Paul, Minn.

Massey-Harris-Ferguson, Inc. Introduces Work Bull Line

The M-H-F Work Bull line of light- and medium-duty utility tractors has been introduced by the new Industrial Division, Massey-Harris Ferguson, Inc., Racine, Wis. Consisting of five tractors and 20 allied attachments, the new line is designed for use in three areas: as primary equipment on small, work-and-run jobs; as back-up machines for single-purpose equipment; and as clean-up and utility tools.

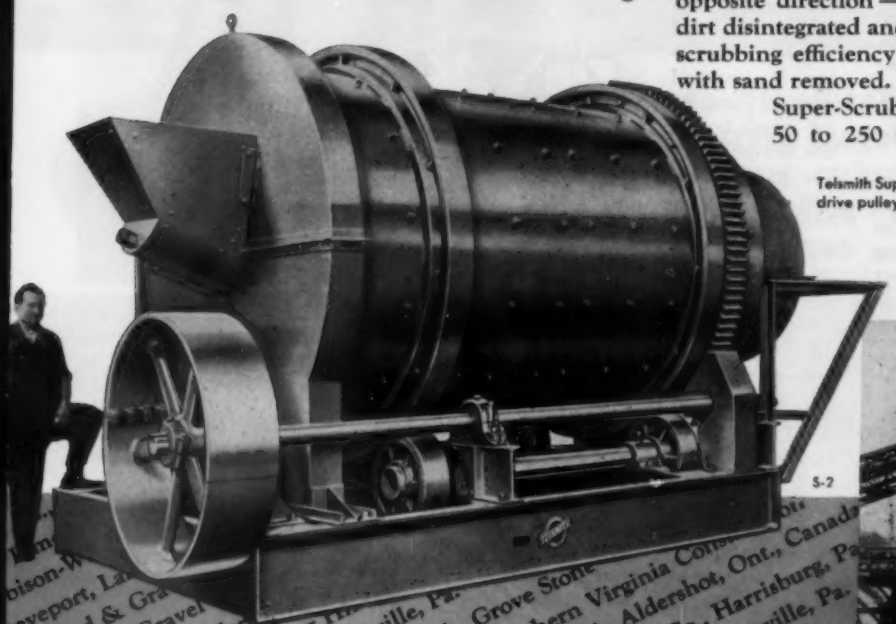
Hydraulically-controlled attachments adapt the Work Bulls to a wide variety of applications.

FOR CLEAN AGGREGATE—HIGH CAPACITY

TELSMITH®

Super-Scrubbers®

● **Most of the better sand and gravel pits are exhausted**—those now in use contain more clay, which must be eliminated. Many states now require that crushed stone be scrubbed before screening to eliminate soft stone, clay and dirt. This demands a better scrubber—one which will eliminate large amounts of clay with a minimum of expense for installation, water, power and upkeep. Telsmith's answer—the Super-Scrubber. **Outstanding features: high speed, terrific impact and grinding action,** much like a ball mill. Aggregate travels from feed to discharge end against clean water flowing in the opposite direction — emerges clean — with clay and dirt disintegrated and carried away by the water. Top scrubbing efficiency on coarse aggregate is obtained with sand removed. **A proven success**—the Telsmith Super-Scrubber made in 4 sizes: 60″ to 96″, 50 to 250 tons hourly. Get Bulletin 266.



Telsmith Super-Scrubber complete on steel frame with flat belt drive pulley. Can be furnished with enclosed, silent-chain drive.

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Three of the five 60-inch diameter Telsmith Super-Scrubbers in Colonial Sand & Stone Co., Inc. plant, Port Washington, New York.

S-2

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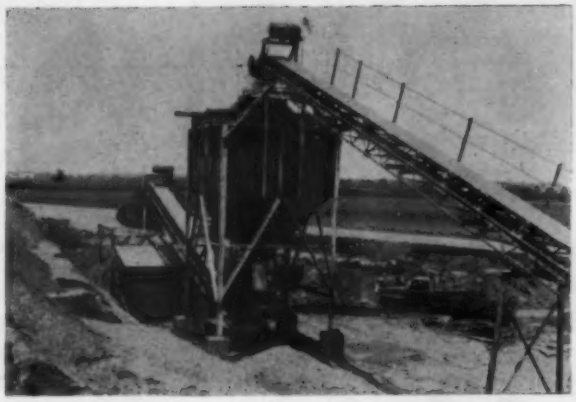
Stabilized Base Materials Produced at Virginia Plant With New Blending Facility

As an adjunct to its present crushed stone operation at Culpeper, Va., the Culpeper Stone Company has recently installed facilities for the production of stabilized aggregate base materials using calcium chloride as the stabilizing agent. Although the plant was built as a speculative move, and no contracts for supplying the material were held at the time of construction, present state highway specifications provide for this material as an alternate in practically all cases where graded aggregate or soil aggregate base is called for. Thus the firm will be able to bid its production competitively.

Equipment acquired by the company and installed for this endeavor at a cost of less than $20,000 includes a pugmill, two conveying systems, three vibrating feeders, and plant feed bins. From beginning to end of the flow through the new plant, all phases are electrically controlled by one operator from a central point.

Raw material is fed to the operation from two sources—an adjacent stockpile of fine screenings, or crusher run stone from the crushing plant about 100 ft. away. The latter is also separately stored in a stockpile of coarse material. The two types are separately moved from their respective stockpile by bulldozer, front-end loader, or clamshell, and discharged into an 8- by 8-ft. feed hopper. The latter is installed over a concrete pit which houses the tail pulley of the main feed belt.



Left: A view of the new facilities from the raw material side showing the main feed conveyor (right) and the two-compartment bin (center).

Below: Finished base course materials blended with calcium chloride are discharged into trucks from the blender, mounted on framework in the foreground.

On the latter, a 24-in. conveyor with 109-ft. centers, the plant feed is transported at the rate of 375 f.p.m. on a 20-degree lift to a discharge point above a divided, elevated bin. The two 37½-ton capacity compartments of this bin are separately supplied with the fine and coarse feed by means of a flop gate at the conveyor discharge point.

From their respective compartments, the crusher-run and fine materials are individually transferred by the appropriate one of two Syntron feeders below the bin to a 30-in. belt conveyor with 50-ft. centers, on which they are moved to the next phase of the processing. A third Syntron feeder adds calcium chloride to the stone on the belt from a 50-gal. drum mounted on the bin supports.

Transported at the rate of 375 f.p.m. on the foregoing conveyor, the materials are discharged to a 3- by 6-ft. Southern Special dual blender. Water is also added at a controlled rate, at the point where the stone and calcium chloride enter the pugmill. Drive for the latter is furnished through a V-belt drive by a 40-hp. motor. Following blending by the mixing blades of the pugmill, the materials are discharged directly into waiting trucks. Designed by Southern Machinery & Supply Company of Roanoke, Va., this new facility will undoubtedly play a part in expanding the use of calcium chloride base stabilization in that area.

Rolling Rockmaster Exhibit Traveling Highways of U.S.A.

Techniques of safe and efficient quarry blasting are being demonstrated in the field in Atlas Powder Company's new rolling Rockmaster exhibit. The converted Volkswagen Microbus is designed to demonstrate the effectiveness of the latest explosives, loading procedures, and blasting techniques.

With shades drawn, the bus becomes a miniature theater. Movies and stereoscopic slides show details of actual blasts to illustrate the principles of controlled blasting. Staffed by experienced Atlas field personnel, the exhibit also carries an extensive library of technical literature, charts, and diagrams, as well as dummy samples of Atlas explosives products.

Operators wishing to arrange for a showing of the exhibit may contact the Explosives Development Section, Atlas Powder Co., Wilmington 99, Del.

This theatre in miniature — a converted Volkswagen bus — is touring the country with an exhibit of movies, slides, literature, and samples, to show the methods of safe and efficient blasting.

at LONE STAR since 1919

TSP Wheels and Gearing on 3 yd. bucket cranes

TSP Drive Pinions on rod, ball and masonry mills

TSP HARDENED PRODUCTS

PINS • BUSHINGS • HERRINGBONE RING GEARS • SHEAVES
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SHAFTS • TRACK WHEELS • SCREW CONVEYOR DRIVE GEARING
CRANE and GENERAL GEARING • HERRINGBONE SHAFT PINIONS
BRAKE WHEELS • BALL, ROD and MASONRY MILL PINIONS

Close-up of masonry mill drive pinion and bull gear

TSP Gudgeons and Bearings on screw conveyors

TSP Sheaves on overhead cranes

"Tool Steel Process" hardened products have established satisfactory service records in plants of the Lone Star Cement Co. They have effected savings in maintenance, replacement and downtime costs.

TSP products are hardened by our special process. The tile hard surface to full depth of permissible wear gives maximum life. The core refined for toughness and ductility gives maximum strength. Each TSP product carries a written guarantee that it will give a longer life in the same service than any other product.

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SMIDTH
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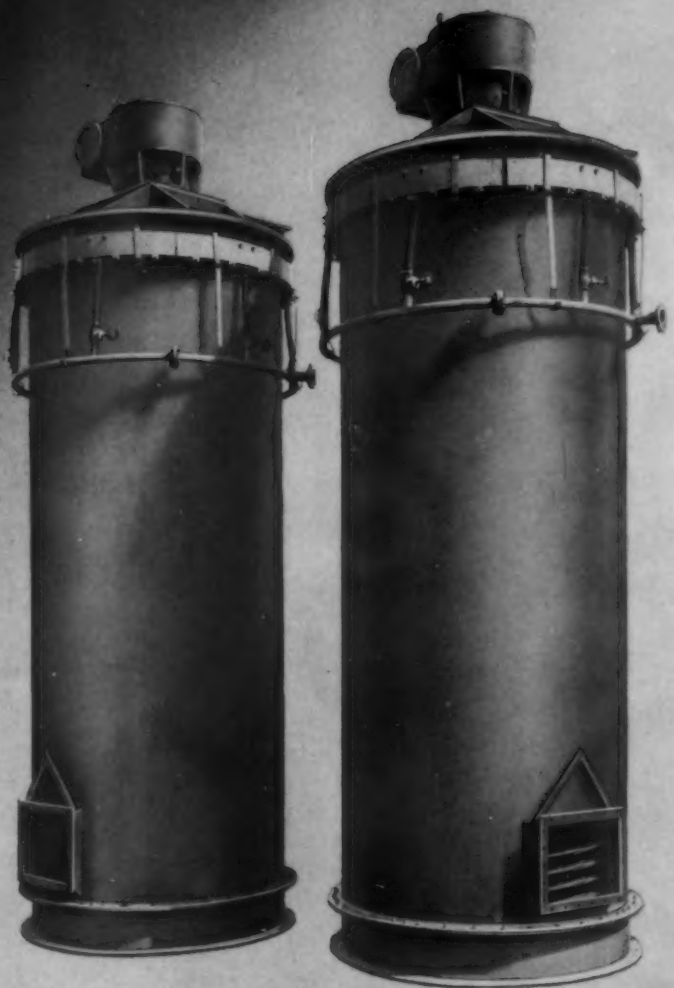

The Smidth Cement Cooler, developed especially for cooling hot cement to temperatures acceptable for bulk shipment or immediate bagging, is externally water-cooled. The hot cement is introduced at the base and conveyed in a thin layer along the cooled interior surface to the top, where it is discharged. High cooling efficiency is assured by the intimate contact of cement and the water-cooled surface.

The Smidth Cooler may also be used with many other similar dry pulverized materials.

Illustrated here are two 6' 6" dia. x 17' 7" high Smidth Coolers ready for shipment.

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F. L. Smidth & Co. (Bombay) Private Ltd.
42 Queen's Road
Bombay, India

P.C.A. Reveals Expansion Of Field Services Setup—Opens Five New Offices

An announcement released by the Portland Cement Association reveals an expansion of its field services to cement users. A new regional office is being opened in Los Angeles to supervise activities of the Los Angeles and Seattle, Wash., district offices, and additional district offices are being opened in Baltimore, Md., Trenton, N. J., Portland, Me., and Louisville, Ky. Staff members are being added or transferred to several of its other 28 district offices and all four of its other regional offices.

The purpose of the expansion is to make the services of experienced highway, structural, and conservation engineers and experts in the use of concrete for farm and home construction available on a more localized basis, particularly in the heavily populated Eastern states, according to G. Donald Kennedy, P.C.A. president.

This expansion will raise the total number of regional P.C.A. offices to five and district offices to 32, covering almost the entire United States, as well as British Columbia.

Other additions and changes aimed at providing more localized service in these areas involved the transfer of 14 senior highway, structural, and soil-cement engineers and construction superintendents formerly working out of the general headquarters in Chicago to regional offices in New York, Chicago, Atlanta, and Kansas City, Mo.

Hugh Barnes has been appointed regional manager in charge of the new Western Regionl Office at 816 West Fifth Street, Los Angeles. Mr. Barnes joined the Association in 1937 and has been Los Angeles district engineer since 1942. Before joining the Association, he was with the Kansas Highway Commission as construction engineer, state highway engineer, and chief of highway planning. A 1920 graduate in civil engineering from Kansas State College, he is a registered professional engineer in California, a member of the American Society of Civil Engineers, and other engineering societies.

John M. McNerney has been appointed district engineer in charge of the Los Angeles district office to succeed Mr. Barnes. Mr. McNerney has been with the Association since 1941, most recently as a statewide paving engineer for the Los Angeles office. Previously he worked for the Missouri State Highway Dept.

Four Association field engineers have been advanced to the position of district engineer to take charge of the three new district offices in the East and the one in Louisville, Ky.

Daniel Webster will be district engineer in charge of the Portland, Me., office. This office will serve Maine, Vermont, and New Hampshire. Mr. Webster previously had been city manager of Old Town and Fairfield, Me., and an engineer with J. P. Webster & Co., Old Town, Me.

The Trenton, N. J., office will be under the supervision of Albert L. Blackwell as district engineer. Mr. Blackwell has been a field engineer for the New York office since 1946. Previously he was employed as a resident engineer by Malcolm Pirnie, consulting engineers, New York, and the Army Engineering Corporation in Puerto Rico and the Virgin Islands. He has also been a field engineer for the New Jersey State Water Policy Commission. He was recently appointed a member of the New Jersey Board of Professional Engineers and Land Surveyors.

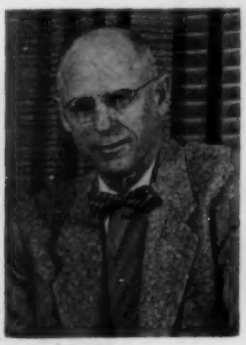
The new Baltimore office, from which activities in Maryland and Delaware will be directed, will be in charge of William J. Moore, who has been serving in the Association's New York office since 1947 as a field engineer. Previously, he was a civil engineer for the New York Department of Public Works and a civil and resident engineer for the U. S. Corps of Engineers and the Department of the Interior.

The Philadelphia and New York offices will devote their activities entirely to Pennsylvania and New York. Each formerly served three states. The present Boston office will handle activities in Connecticut, Massachusetts, and Rhode Island.

The Louisville district office, to be headed by J. J. Farra as district engineer, will direct Association activities in Kentucky. Mr. Farra has been with the Indianapolis office since 1947 as a field engineer. Before joining the Association, he was assistant to the chief engineer of the Erwin-Newman Company, engineers and contractors, Houston, Tex., and was with the engineering department of the West Virginia Steel and Manufacturing Co., Huntington.

R. A. Morin, who was formerly assistant general traffic manager of the United States Gypsum Company, has been named general traffic manager.

J. M. McNerney



Hugh Barnes

Daniel Webster

A. J. Blackwell

W. J. Moore

J. J. Farra

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"That's what it takes in a truck to keep rolling in our business"

...reports Hall Sand and Gravel, Inc., Denver, Colorado.

"We bought our first Reo in 1945, a used Dumper and it's still on the job. It proved to us that, dollar for dollar, there's no better truck to be bought.

"*Rugged strength* in a truck is a prime factor in our business, and Reo really has it. We wonder how they can take such punishment. No other truck has the guts that's built into these trucks.

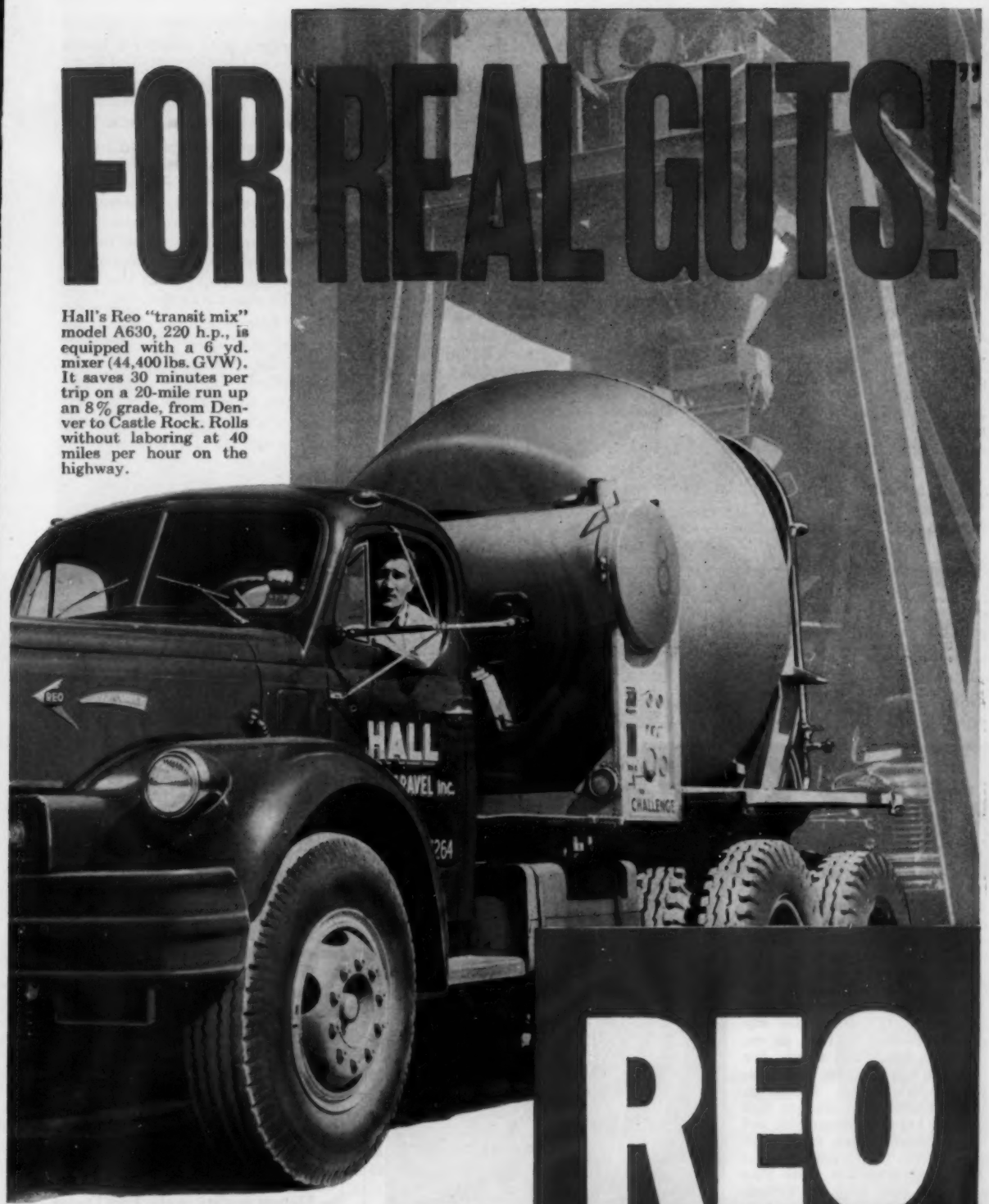
"Our short-run stop-and-go hauling, requires more gear shifting than an over-the-road haul from Denver to Chicago. This is tough on a truck engine, and we've never had an engine failure in all the time we've been operating Reos."

Reo specializes in custom building heavy-duty trucks for tough jobs like those in the construction business. On or off-highway models with gas or LPG Gold Comet Engines—sixes or V-8's, from 107 to 220 h.p. Reo's advanced *short-stroke, wet-sleeve* Gold Comet engines are available in rugged Reo chassis or for replacement. *They are all backed by a 100,000 mile or 1 year warranty.*

THE HALL FLEET OF REOS delivers sand, gravel and concrete in the South Denver area. As much as 2,000 tons of sand and gravel and 338 yds. of concrete per day.

FOR REAL GUTS!"

Hall's Reo "transit mix" model A630, 220 h.p., is equipped with a 6 yd. mixer (44,400 lbs. GVW). It saves 30 minutes per trip on a 20-mile run up an 8% grade, from Denver to Castle Rock. Rolls without laboring at 40 miles per hour on the highway.



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Bureau of Public Roads Predicts Material Needs For 1956-1969 Highways

The materials requirements for roadbuilding through 1969 have been forecast by the U. S. Bureau of Public Roads, and officials of that organization say that over the next 13 years all roadbuilding—including federal-aid, state, and local—will require 49,000,000 tons of steel, 1,399,000,000 bbl. of cement, 128,000,000 tons of bituminous material, and 9,170,000,000 tons of aggregate.

At the peak of the program, it was estimated, 442,000 men would be employed directly on highway jobs. Normally, as many more men are required in the supporting industries, such as equipment manufacture and materials production.

The figures for 1957 through 1969 represent estimated requirements for all highway construction, including not only the $32,900,000,000 program authorized by the Federal Aid Highway Act of 1956 and funds remaining from previous authorizations, but also the additional federal-aid work contemplated to be authorized by future legislation, together with state, county, municipal, and other highway construction expected to be performed without assistance.

The total financing of highway construction, other than federal funds, considered for these estimates is based on the premise that such expenditure will continue at about the 1956 level for each ensuing year. Requirements for airports, private roads and driveways, and maintenance are not included.

In explaining the materials estimates, Bureau spokesmen said:

"The quantities required for any highway construction program will vary inversely with prices for material, labor and equipment, and highway construction bid prices. The estimates are based on the assumption that prices will remain constant.

Material quantities shown in the accompanying tabulation indicate material usage factors developed from data reported by contractors on highway construction projects involving federal funds. The factors vary somewhat from year to year. It was found generally that the 1955 factor was about average.

Usage factors also vary due to the nature of the work. The usage of cement, for example, generally is comparatively higher on primary and urban work than it is on secondary work, whereas the average asphalt usage is higher on secondary projects.

Material factors for work on the interstate system have been found to vary somewhat from those on regular primary work.

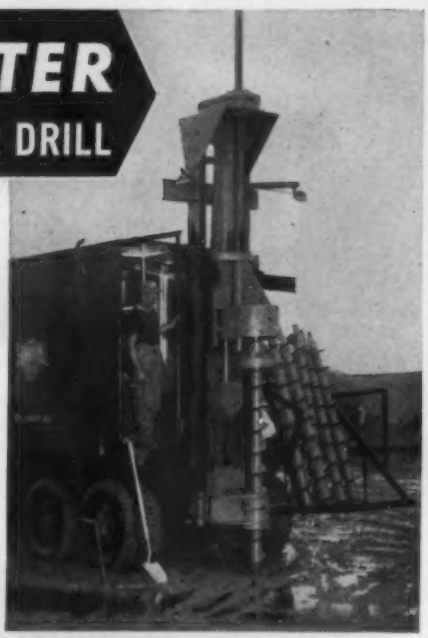
Requirements shown for 1955 are based on 1954 usage factors for all systems. For 1956 and the future years the 1955 factors for the individual systems were weighted, in accordance with the estimated amount of work to be performed on each system, to obtain a composite factor.

Estimated Material Requirements For An Expanded Highway Construction Program

Calendar Year		1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	Total 1957-1969
	Units																
Cement[1]	Million tons	61.6	74.0	94.5	102.9	107.4	110.5	110.8	111.2	111.5	113.3	113.6	112.6	110.1	103.6	97.0	1,399.0
Bituminous Material	Million tons	5.85	7.15	8.73	9.40	9.90	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	9.34	8.77	127.67
Aggregates[2]																	
Purchased[3]	Million tons	201	228	278	303	316	325	325	325	325	325	325	325	325	298	280	4,075
Produced[3]	Million tons	202	316	386	419	437	449	449	449	450	449	449	449	449	412	388	5,635
Total Aggregates	Million tons	403	544	664	722	753	774	774	774	775	774	774	774	774	710	668	9,710
Concrete Culvert Pipe	Million tons	2.64	2.89	3.29	3.57	3.72	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.51	3.30	48.08

[1]Does not include cement in concrete culvert pipe.
[2]Does not include aggregates in concrete culvert pipe.
[3]By contractors.

40% FASTER
THAN ANY OTHER DRILL



● The McCarthy Vertical Auger Drill cuts drilling time in earth, clay, compacted sand and gravel, hard pan, shale, sandstone and rock as much as 40%. Rugged construction permits you to drive 2 to 24-inch augers to depths of as much as 125' faster than any other drill. Get the facts on the powerful McCarthy today. See how you can complete shot hole, exploration drilling, foundation holes, dewatering operations, well drilling, highway construction and heavy contract work faster than ever before. The versatile, vertical McCarthy gives you more than any other drill. Write for Bulletin M-100 now. Let us show you how you can turn new profits on your drilling job.

McCarthy Vertical Auger Drill Model 106-24

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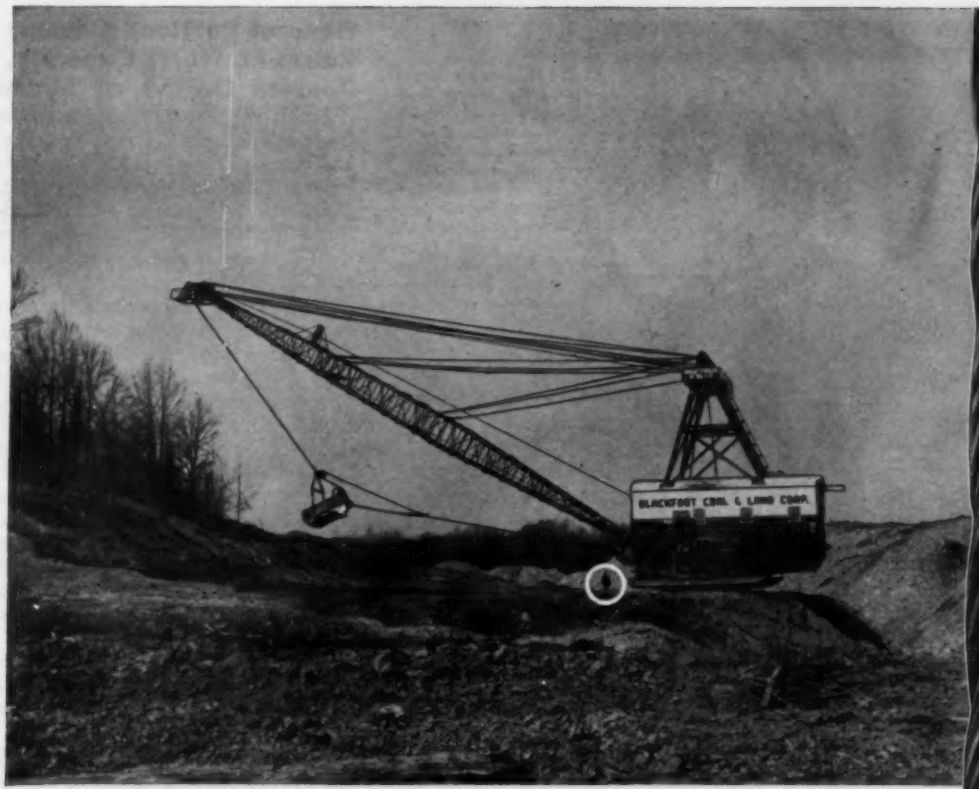
New Gypsum Plant Launched By Celotex at Fort Dodge

Ground-breaking ceremonies were held recently at the site of the Celotex Corporation's new gypsum products plant near Fort Dodge, Iowa. Civic officials and company representatives participated in the event, marking the start of construction of the $5,000,000 plant. The buildings will cover about 175,000 sq. ft.

The company's gypsum rock deposits are among the largest and of the highest quality in the Fort Dodge area.

MALCOLM S. MCINTYRE, general sales manager of the Aggregate Division, Basalt Rock Company, Inc., Napa, Calif., has retired from the company after 23 years of service.

JOSEPH E. MIRANI succeeds Mr. McIntyre as general sales manager.



50% Longer Life from VHS Dragline

. . . at Blackfoot Coal and Land

• Mr. Henry Fitch, Superintendent of Blackfoot Coal and Land Corporation, Oakland City, Ind., says: "The two ropes on our Bucyrus-Erie 500W Dragline normally lasted only from 1½ to 2 months—even though we used the best Improved Plow Steel lines we could get. We were pleasantly surprised when our first VHS line lasted over 3 months—an increase in service life of well over 50%. Naturally, we are using VHS from now on out."

New Grade of Steel

VHS is setting service records like this on draglines, shovel hoist ropes, and scraper cables all over the country. Made from a new grade of steel for wire rope, it is at least 15% stronger than IPS—the strongest grade formerly available. This means you can handle heavier loads with the same diameter line. And you get a higher factor of safety.

Cuts "Down Time"—Saves Money

New VHS is not only stronger, it is tougher, too. It resists abrasion . . . keeps its shape under pressure . . . can't become "hidebound" or lose its flexibility. It lasts longer in the toughest applications . . . such as draglines, shovel hoist ropes, and scraper cables.

The longer life you get with VHS saves you money. And you make more big savings by cutting "down time" of equipment for wire rope replacement.

At Your Distributor Now

Your distributor has scraper cables, draglines, and shovel hoist ropes of new LAY-SET VHS in stock now. Just call him and tell him the size and diameter you want. You don't need any complicated specifications.

For more information see your Hazard distributor salesman or write to the nearest Hazard office for Bulletin DH-513H

HAZARD WIRE ROPE DIVISION
American Chain & Cable Company, Inc.
Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.

LAY-SET VHS

15% Stronger • Tougher • More Wear-Resistant

• This stamp, issued by the French Government for French West Africa, shows a Letourneau-Westinghouse scraper at work on a highway connecting the two largest cities in the Ivory Coast Territory — Abidjan and Abengourou. The stamp is one of a set of five featuring this road. Work on this project has been done with the help of American equipment.

President Eisenhower Signs Social Security Amendments

When President Eisenhower recently signed into law the Social Security Amendments of 1956, the following changes in tax schedules became effective:

Employer and employee rates have been increased to 2½ percent with respect to wages received during the calendar years 1957 to 1959, both inclusive.

Self-employed rates have been increased to 3⅜ percent for any taxable year beginning after December 31, 1956, and before January 1, 1960, on self-employment income up to $4,200 per year.

The increasing scale for subsequent years in the Internal Revenue Code of 1954 will continue to apply with increases proportionate to the changes noted above. Additional professions have been covered under Social Security.

In general these amendments permit women to retire at 62 and the disabled to draw benefits at 50.

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STEEL DROP BALL

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2000 to 12000 lbs.

Budget-minded quarrymen specify the "Cape Ann" Drop Ball to insure record rock-breaking efficiency. Equipped with a forged connecting link, protected by a deep recess, adaptable for swivel or shackle. Strong alloy steel pin. Low cable replacements. Furnished complete as shown.

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Gloucester • Massachusetts

General Portland Cement Raises Ft. Worth Capacity, Doubles Output at Miami

Smith W. Storey, president of the General Portland Cement Company, has revealed that the annual capacity of the firm's plant at Fort Worth, Tex., will be increased by an additional 1,250,000 bbl., bringing the total capacity of the operation there to 3,250,000 bbl.

Construction will begin in the near future on a new plant near Miami, Fla., where plans have already been made to provide for doubling the original planned capacity to 2,500,000 bbl. annually.

Mr. Storey stated that with the completion of the firm's current expansion program (in 1958) General Portland will have a total rated capacity of 18,800,000 bbl. of cement per year. In addition to the Fort Worth facility the company operates plants at Dallas, Houston, Chattanooga, and Tampa.

In the first half of 1956 net earnings of the firm were $4,905,000, compared with $3,820,500 in the comparable period in 1955.

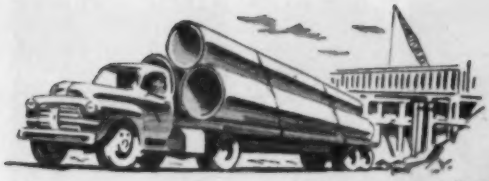
Standard Lime & Cement To Expand Manistee Plant

Construction was recently begun on a major expansion program designed to double the capacity of the Standard Lime and Cement Company's plant at Manistee, Mich. Included in the expansion program will be an additional rotary kiln, more thickeners and settling basins, reactors, and companion equipment. Loading facilities at the plant will also be improved and enlarged.

Completion of the enlarged facilities is scheduled for June, 1957, according to Archie Houser, superintendent.

K. L. Hammond, who was for many years affiliated with the Keystone Lime Works, Keystone, Ala., is now sales manager of the Alabaster Lime Company, Siluria, Ala. Keystone Lime Works, which Mr. Hammond formerly served as secretary-treasurer, was recently purchased by the Southern Cement Division of American Marietta Corp.

The dates for the annual meetings of the Pennsylvania Stone Producers Association and the Pennsylvania Highway Material Producers Conference have been changed to January 24 and 25, 1957. These meetings will be held at the Hotel Penn-Harris, Harrisburg, Pa.



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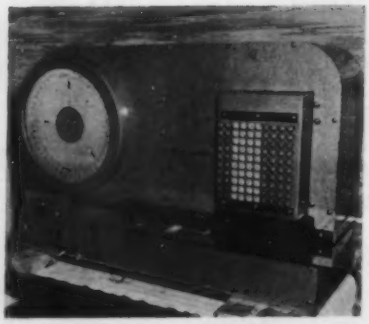
Fairbanks-Morse Announces New Electronic Equipment

The constantly growing identification of electronics with processing operations and equipment in many industries was recently highlighted in a two-day meeting of Fairbanks, Morse & Company's scale division personnel and branch managers at the LeClair Hotel, Moline, Ill.

New products announced or displayed there to the division branch managers, the press, and to the general public *via* television, included several electronic weighing devices—a Batchetron; an EPC or electronic program control for successive manufacturing operations such as in weigh batching; a belt conveyor scale that "weighs in motion"; plus electronic and levetronic truck, rail, and axle load scales.

As described by Robert H. Morse Jr., president, the truck, rail, and axle load scales are now offered in both the electronic and levetronic systems. In the former, or full electronic setup, the scale's weighbridge is mounted on "load cells" which offer varying resistance to the current in the circuit as weight is applied or removed. The varying electrical energy is transmitted through a cable to the instrument, where the energy is measured, interpreted, and converted to pounds for the indicator face.



A table-mounted instrument that has a hold or "memory" circuit, selective weigh and print buttons, and a net-gross switch.

The levetronic system employs mechanical levers under the weighbridge with a load cell linked in tension to the steelyard. The remainder of the system is identical to the full electronic installation. It was stated that the levetronic setup is frequently used to convert mechanical scales to electronic weighing and recording.

The new electronic belt conveyor scale exhibited is reported to have a speed of response of six-tenths of a second and is also equipped with load cells of the compression type.

The Fairbanks-Morse electronic program control (EPC) weigh batching will successively select desired aggregate bins, weigh out the predetermined amount of the material into one or several weigh hoppers, and discharge the batch, all with control directed by electronic "reading" of a pre-punched plastic card inserted into an operating console. With a file of cards carrying numerable variations, an operator can, it is said, produce from a large selection of batching proportions while keeping possible human error at the minimum.

The meeting, which was held under the direction of C. G. Gehringer, scale division manager, was attended by company personnel from Canadian and Mexican offices, as well as domestic branches. Guests were given an opportunity to visit the company's East Moline plant, where the electronics division, organized in Davenport, Iowa, in 1947, was recently moved to meet its need for expanded facilities.

A view of the inner mechanism in a wall-mounting type of remote instrument for weighing material on a conveyor belt.

Riverside Cement Expansion Starts at Oro Grande Plant

The Fluor Corporation, Ltd., Los Angeles engineering and construction firm, was awarded a contract by the Riverside Cement Company to design, engineer, and construct additional facilities for the cement concern at Oro Grande, Calif.

This contract will cover a 50 percent expansion of Riverside's finish cement producing facilities, a new cement pack house, and two bulk loading stations.

Construction began in August, and completion is scheduled for July, 1957. Cost of the project is approximately $3,500,000.

Riverside is at present revising its steam-electric power plant at Crestmore (near Riverside), Calif.

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Open Drip Proof, Totally Enclosed Fan Cooled, Totally Enclosed Non-Ventilated, NEMA "C" flange and "D" flange, Extended Shaft Pump Motors and Special Motors.

Brook Motors are precision built throughout, to surpass NEMA specifications. All over the world they have established a brilliant performance record for many years. **THEY COST EVEN LESS** than ordinary motors because of volume production and exclusive manufacturing techniques. Compare them feature for feature and you'll select a Brook. Send for Brochure.

● FAST DELIVERY OF ALL POPULAR MODELS:

Brook Motors are available from warehouses at Chicago; Dallas; Jersey City, N. J.; Los Angeles; San Francisco; Salt Lake City; Memphis, Tenn.; Savannah, Georgia; Seattle; Tampa, Fla.; and other major distributing points.

Since 1904

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Raves for no ravin' beauty...

"What a beating! But in 12 years, trucks have never had a lubrication failure!"

FOX RIVER'S MIGHTY MACHINES all provide trouble-free performance using Cities Service Gasolene, Diesel Fuel, and Lubricants. These outstanding products help the company operate at 150 tons per hour.

THAT'S DUST, BROTHER! This motor, buried in dust, is typical of operating conditions at Fox River Stone Company. Yet, using Cities Service Pacemaker Oil, there's never been a bearing failure. Never any lubrication problems.

Fox River Stone Company, Elgin, Illinois, reports trucks wear out externally, are still good internally using Cities Service Lubricants.

Operating at the rate of 150 tons per hour under the toughest conceivable quarry conditions, Fox River Stone Company produces barn and agricultural lime, 2" and 3" stone for road construction, "A" and "B" binder for asphalt road construction, flagstones, and a host of other crushed stone products.

Yet, during the last 12 years, there's never been a lubrication failure of any kind in any piece of machinery using Cities Service Lubricants.

With the aid of Cities Service Gasolene, Diesel Fuel, and Trojan H-2 Multi-Purpose Grease, Fox River's many shovels, pay loaders, and trucks have given constantly flawless performance. And despite the extremely dusty quarry conditions, exposed electric motors have never lost a bearing using Pacemaker 150 T Lubricating Oil.

Not one lubrication failure in any of this equipment during 12 years of rugged operation! That's Fox River's record with Cities Service and it can be your record when you start using Cities Service Products. For information, talk with your nearest Cities Service representative or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

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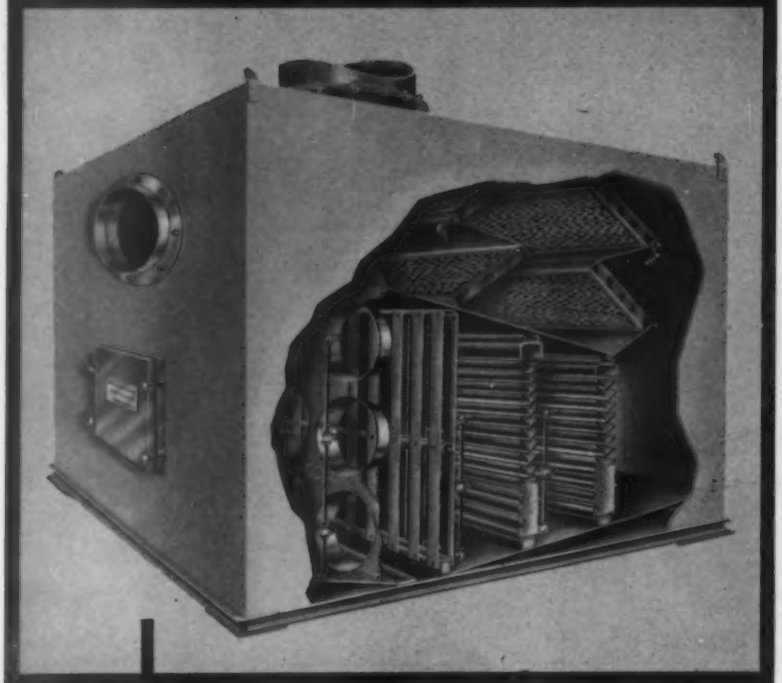
QUALITY PETROLEUM PRODUCTS

Better dust control...



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- ROTARY KILNS
- DRYERS
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NOW better dust control can be yours with the new Johnson-March Type H Liquid Precipitator Scrubber. This unit is the result of years of research and experience in effectively controlling dust in Asphalt and Rock Products plants. Very high efficiency dust collection is obtained through multiple action scrubbing of dust laden air. Available in sizes up to 40,000 c.f.m., the new Type H unit is engineered and built by the makers of the famous J-M low-cost liquid systems for controlling dust before it becomes airborne at crushers, screens, hoppers and conveyors.

• For an obligation free analysis of your dust problems, write . . .

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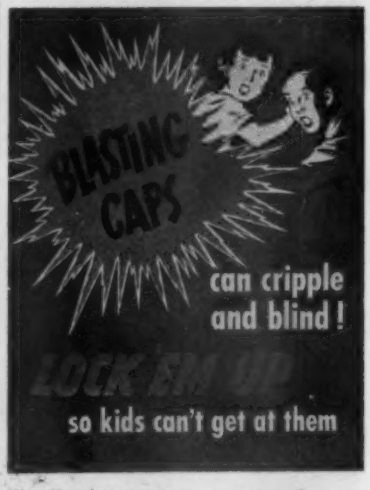
CANADIAN REPRESENTATIVES: G. F. Sterne and Sons, Ltd., Brantford, Ontario

Explosives Makers Publicize Aids for Accident Prevention

As a part of its continuing campaign to safeguard children against the dangers of blasting caps, the Institute of Makers of Explosives is



distributing a new poster and pamphlet to contractors, miners, quarry operators, and other users of commercial explosives.

Designed for use on bulletin boards, magazines, and tool sheds wherever blasting caps are used or stored, the four-color poster warns, "Blasting Caps can cripple and blind! Lock 'em up so kids can't get at them." The pamphlet drives home the fact that blasting caps are safe only in experienced hands.

For more than 30 years the institute—an association of commercial explosives manufacturers — has spearheaded a nationwide safety program to eliminate blasting caps mishaps. One phase of the campaign is directed at alerting boys and girls to the hazards of playing with caps. In support of this effort, the Institute has the assistance of the schools and organizations such as the Boy Scouts and Girl Scouts, the International Association of Chiefs of Police, 4-H Clubs, Future Farmers of America, the U. S. Post Office, the Bureau of Mines, radio and TV.

Industries regularly using dynamite and caps are co-operating wholeheartedly in a drive to keep caps from falling into the hands of children. Precautions for safe handling naturally vary by industry, but wherever caps are used "Play it safe" is the watchword.

In spite of the steady rise in the use of commercial explosives and the country's ever-increasing child population, the accident rate has been cut from 0.76 per million pounds of explosives in 1926 when this work was started to 0.12 last year.

OPEN FOR BUSINESS

New refractories plant at Columbiana, Ohio to give better-than-ever service to the cement industry!

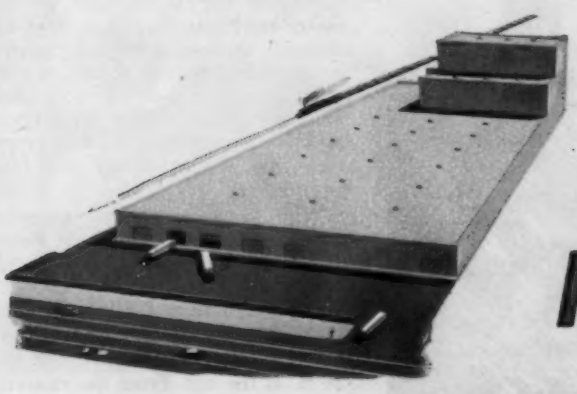
THE NEW Kaiser Chemicals refractory plant at Columbiana, Ohio has now begun production of cement kiln refractories.

Located on a 100 acre site adjacent to the main line of the Pennsylvania Railroad and the Ohio-Pennsylvania Turnpike, the new Columbiana plant assures rapid rail and truck transportation to cement producers in the Midwest and East.

Already serving the nation's cement industry from three plants in California, this new *Kaiser Chemicals* facility means new production to meet the increasingly heavy demand for Kaiser kiln liners. The new Columbiana plant will manufacture basic brick, mostly of the Periclase Chrome and Chrome Periclase types.

These refractories are *especially designed* for peak performance in specific cement kiln hot zone applications. In fact, for more than 12 years Kaiser Periclase Chrome kiln liners have *set the standard* of performance for the industry. *That is why more and more cement producers regard them as the most dependable refractories available today!*

If you have a high temperature problem in your rotary cement or dolomite kilns which might be solved by the prompt delivery of superior quality, dependable refractories, why not get in touch with us?



For more information call our nearest Sales Office: Kaiser Chemicals Division, 1924 Broadway, OAKLAND 12, Calif. ... 3 Gateway Center, PITTSBURGH 22, Pa.... 518 Calumet Bldg., 5231 Hohman Avenue, HAMMOND, Indiana.

To obtain free copies of Kaiser Chemicals product literature write Kaiser Aluminum & Chemical Sales Inc., 1924 Broadway, OAKLAND 12, California, Dept. C62x11.

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See "THE KAISER ALUMINUM HOUR." Alternate Tuesdays, NBC Network. Consult your local TV listing.

Rock-Fill for Dam Processed With Feeder-Scalper

ON a mountainside about six miles south of Alma, Colo., men and machines are steadily hammering away for 20 out of every 24 hours at the task of "moving the hill from here to there"—only they won't be moving it back. As a result of these efforts, 18,000,000 gallons of fresh water will be provided daily for the city of Colorado Springs from a reservoir behind Montgomery Dam.

Scheduled for completion next year, the dam, which is being constructed by the Fisher Contracting Company of Phoenix, Ariz., will cost $2,300,000 and represents a couple of "firsts" in civil engineering practice in this country. Not only does this dam have the highest elevation of all such structures in North America, but it is constructed of rock-fill faced with a waterproof membrane of asphaltic concrete—the first of its kind to be built in the United States.

Due to the design of the dam, which with the membrane mentioned above requires a supporting base that will allow free drainage, specifications covering the rock in different parts of the base were necessarily rigid. While 10 percent of fines were allowed in the core, no fines at all were permitted in the covering layer. If fines were not removed, they would interfere with drainage through retention of water, a situation probably resulting in a ruptured membrane as the result of freezing during winter months.

To provide nearly 750,000 tons of rock required in the dam construction, the Fisher company started with stripping operations on the side of the Blue River valley near the dam location in August, 1954. By May of this year, nearly half of the rock-fill material had been quarried and moved into place on the 2,200-ft. long embankment.

At the quarry site overlooking the dam, a pair of shovels continuously load blasted granite, through the two 10-hour shifts, into Euclid end-dump haulage units. The material is highly abrasive and necessitates replacement of bucket teeth daily at the end of each second shift.

The nature of the rock-fill construction is such that about half of the rock from the quarry can be trucked directly to the embankment, while the remainder must be processed for the removal of fines. The core contains rock from 4 in. in size up to boulders weighing as much as five tons. A 10-ft. layer containing material from 3-in. up to 5-ton boulders covers the core, and must contain no fines. The outer layer is 9 in. thick and is comprised of rock in the ¾- to 3-in. range, from which the fines must also be extracted.

These materials for the outer two layers are trucked to the processing plant from the quarry and are dumped onto a Universal Engineering Wobbler feeder. Set on a 12½-in. pitch, the unit is 5 ft. wide, and has 13 wobbler bars with 3½-in. openings between bars. These wobbler bars at the bottom of the feeder are oval in cross-section and are set with the long axis of the oval vertical and horizontal on alternate bars, thus providing a rocking, tumbling motion to the materials dumped on them.

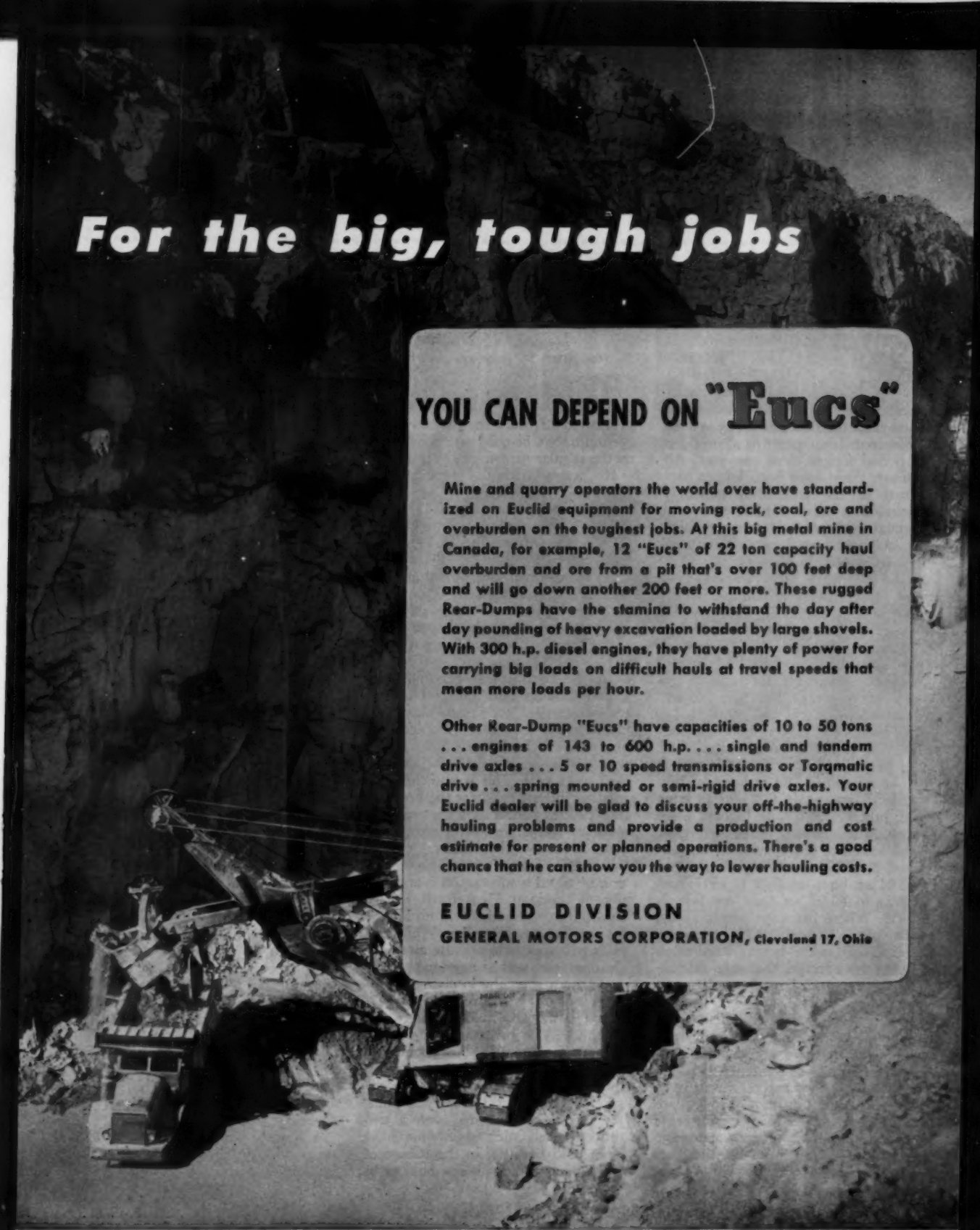
Replaceable chain loops seen here between ribs on the bars prevent slabby material from passing through the bed.

This churning results in a separation of the fines, which drop through the bars and onto a belt conveyor for transport to further processing. Replaceable chain loops between ribs on the bars prevent long, slabby pieces from passing through the wobbler bed. Material retained on the wobbler bars is moved by them to the end of the feeder and discharge into waiting trucks for the haul to the dam.

Feeder throughs received on the belt are taken to a shaker screen which is equipped with a ¾-in. slotted deck. Since about 30 percent of the quarry-run rock handled by the feeder consists of fines, and nearly half of this is salvaged on the shaker screen as plus ¾-in. rock-fill material, total waste from the quarry is reported to be only about 7½ percent. During a peak 20-hour day, the feeder has handled an average of 250 cu. yd. per hour of quarried rock that weighs nearly two tons per yd.

With a 150-man crew operating virtually around the clock, the Fisher firm is endeavoring to meet a deadline by the end of September for the placement of all rock-fill on the dam. When completed, the base will have a 400-ft. thickness at the bottom and 20 ft. at the top. From the reservoir which this dam will create, water will flow 75 miles through a 30-in. pipe.

About half of the material used in rock-fill for Montgomery Dam must be processed here for the removal of fines prior to placement. Throughs from the feeder-scalper, foreground, are screened to recover the plus ¾-in. fraction.



For the big, tough jobs

YOU CAN DEPEND ON "Eucs"

Mine and quarry operators the world over have standardized on Euclid equipment for moving rock, coal, ore and overburden on the toughest jobs. At this big metal mine in Canada, for example, 12 "Eucs" of 22 ton capacity haul overburden and ore from a pit that's over 100 feet deep and will go down another 200 feet or more. These rugged Rear-Dumps have the stamina to withstand the day after day pounding of heavy excavation loaded by large shovels. With 300 h.p. diesel engines, they have plenty of power for carrying big loads on difficult hauls at travel speeds that mean more loads per hour.

Other Rear-Dump "Eucs" have capacities of 10 to 50 tons . . . engines of 143 to 600 h.p. . . . single and tandem drive axles . . . 5 or 10 speed transmissions or Torqmatic drive . . . spring mounted or semi-rigid drive axles. Your Euclid dealer will be glad to discuss your off-the-highway hauling problems and provide a production and cost estimate for present or planned operations. There's a good chance that he can show you the way to lower hauling costs.

EUCLID DIVISION
GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

Labor Developments

The Steel Settlement

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations
Washington, D. C.-Philadelphia, Pa.

NOW that the dust kicked up by this year's steel strike has settled, it is possible to look back and determine with some clarity what happened. Almost for the first time since the steel industry has been unionized, labor peace is assured for a period longer than one year. Although there have been longer contracts in the past, they generally included a clause which permitted annual reopening of one provision or perhaps several provisions, principally concerning wages.

To be sure, the steel companies did not get the five-year contract which they sought originally, but they did secure a three-year, non-reopenable, no-strike contract. This contract spells out the wage rates, and thereby the wage increases, for each of the next three years—and they are not inconsiderable.

The lowest wage rate, which was $1.68½ an hour, was raised to $1.82 an hour on August 3, 1956, and is to be raised to $1.89 an hour on July 1, 1957, and again to $1.96 an hour on July 1, 1958. The highest wage rate, which was $3.45½ an hour, was raised to $3.71 an hour on August 3, 1956, and is to be raised to $3.84 an hour on July 1, 1957, and again to $3.97 an hour on July 1, 1958. Where incentive wages apply, they are to be increased by the same proportion as the hourly wage rates.

On the average, the wage rate increases amounted to about 10 cents an hour this year and will amount to 7⅓ cents an hour in each of the subsequent two years. Annual wage increases in these amounts are not very unusual and are not likely to have any serious repercussions. Even the provision for cost-of-living adjustments, although somewhat more liberal than past arrangements and provisions found in many other contracts, has, nevertheless, come to be regarded as a relatively standard feature in many labor agreements.

Much more unusual is the Sunday premium pay provision which requires that for all time worked on Sunday (defined as the 24 hours beginning with the turn-change time nearest to 12:01 a. m. (Sunday), a premium shall be paid which is based on the regular rate of pay as follows:

10 percent, from September 1, 1956, to June 30, 1957;

20 percent, from July 1, 1957, to June 30, 1958;

25 percent, from July 1, 1958, to June 30, 1959.

On the average, this premium for Sunday work is expected to amount to 25 cents per hour in the first year, 52 cents an hour in the second year, and 68 cents an hour in the third year.

In the past it was generally assumed that because the steel industry necessarily involves around-the-clock, seven-days-a-week operation, any payment for inconvenient hours was already included in the negotiated wage rate. This is also the case in other industries where the production process necessitates the employment of some portion of the work force at inconvenient hours.

Breaking away from this assumption involved a substantial reorientation of thinking. Henceforth, in the steel industry, Sunday will no longer be just like any other day. While the mills will appear to operate as usual, the operation will be more expensive, and only the absolutely essential workers will be employed. This is exactly what the union tried to accomplish by its insistence on premium pay for Sunday. The importance of its victory in this connection to other industries is that they, too, can expect demands for special premiums for inconvenient hours even if traditionally no such premiums have been paid because, in the nature of the business, those hours had to be worked.

Probably the next most significant change in the steel contract was the inclusion of a supplementary unemployment benefit plan for which the companies are required to contribute no more than 5 cents per hour. The benefits to be provided under the plan are to be applicable to all employees with two or more years of service. Supplementary unemployment benefits are, of course, the new form of what used to be called the "guaranteed annual wage." It is not surprising that this demand was won, but rather that it was won so easily and without turmoil, despite the fact that the guaranteed wage has long been a bitterly contested issue.

Other important additions in the steel contract are the following:

1. The inclusion of Good Friday in the list of holidays, which makes a total of seven paid holidays a year.

2. An increase in the overtime rate paid for hours worked on holidays to double time and one-tenth after June 30, 1957, and double time and one-quarter after June 30, 1958.

3. An additional half week of vacation pay for employees with 3, 10, and 25 years of service, so that the new vacation schedule is as follows:

Years of Service	Vacation	Extra Pay
1 or more	1 week	
3 or more	1 week	½ week
5 or more	2 weeks	
10 or more	2 weeks	½ week
15 or more	3 weeks	
25 or more	3 weeks	½ week

Finally, the steel contract required increased contributions to the insurance fund of 3 cents per hour, half of which is paid by the companies and half by the employees.

The union has figured out that the total cost of all the above amounts to 20.3 cents an hour for the first year, an additional 12.2 cents an hour for the second year, and an additional 13.1 cents an hour in the third year.

It had been widely predicted that these large cost increases would call forth very large increases in the price of steel—up to $12 or more per ton. Actually, the price increase finally announced was far more modest, amounting to $8.50 a ton. All of the reasons for this conservative price policy are not known. However, the fear of further investigation in an election year may have formed a part of the background, as well as the pressure of customers (such as the automobile industry) who suffered some adversity in the last year.

ROGERS JOPLIN

SINGLE PASS PORTABLE CRUSHING SCREENING PLANT

THE COMPLETE ROGERS LINE:

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- APRON FEEDERS
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- PORTABLE CRUSHING PLANTS
- CONVEYORS
- WASHERS
- DRILL JUMBOS
- MINE HOISTS
- REVOLVING SCREENS
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- UNDERGROUND LOADERS
- ELEVATORS
- ROLL CRUSHERS
- HAMMERMILLS

ROGERS JOPLIN

Light-Weight | **Versatile**

High Production | **Low Cost**

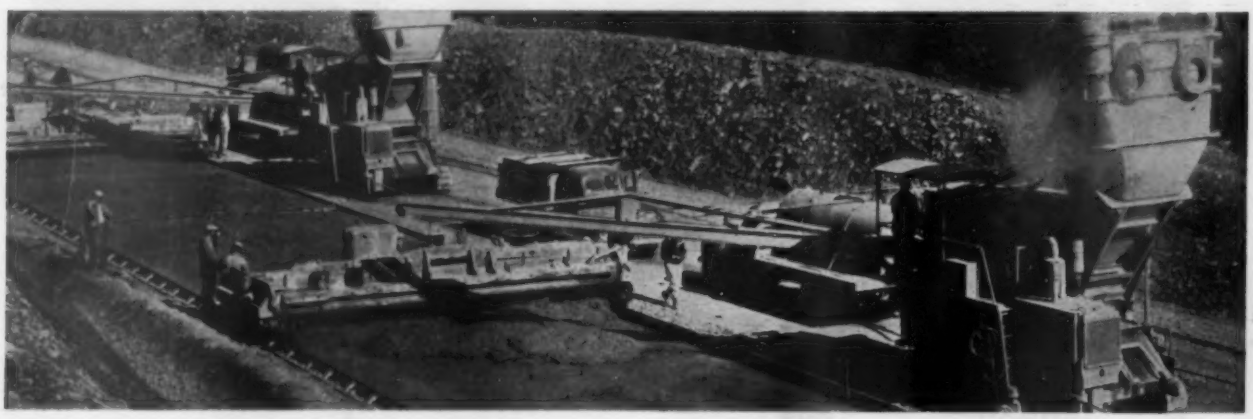
Recognizing the need for a small, compact, yet high production plant, ROGERS has designed and marketed this new single pass crushing and screening plant. The feeder hopper may be placed with the low side to the back or on either side so that a front-end loader may feed from any one of three directions. Stroke of the feeder may be adjusted in a few minutes to change the feed rate. Illustrated plant is equipped with a Rogers 10 x 36 crusher and a Rogers Seco 3 x 8 screen. The product is discharged at 9-foot truck loading height from the front of the plant. The chassis is equipped with a removable front dolly and is provided with pin for tractor hitch. The plant includes operators platform and fuel tank. Air brakes can be furnished when desirable. Other sizes of single pass plants are available.

R-103

ROGERS IRON WORKS COMPANY
Joplin, Missouri

the road building boom depends o

1 ...*from producers of cement, sand and gravel, crushed stone and other non-metallic minerals come the materials necessary for road construction . . .*



2 ...*vital ingredients in any road construction that's part of our nation's $51 billion road building program...*

here's what it takes to keep this road building program rolling

MATERIAL REQUIREMENTS HIGHWAY CONSTRUCTION (1)

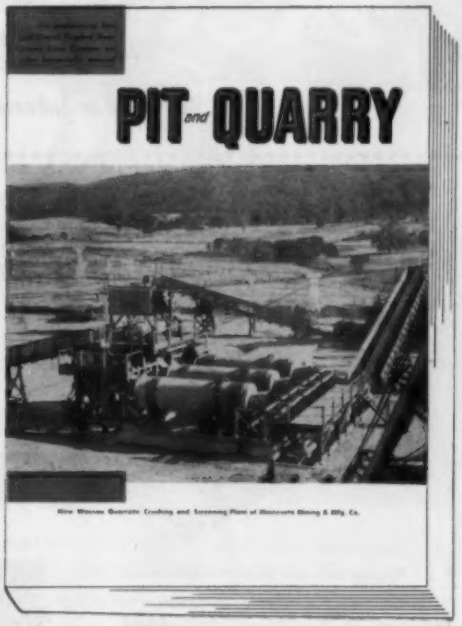
	UNIT	1955 $4.6 BILLION PROGRAM LEVEL (1000's)	FOR EACH $1.0 BILLION INCREASE IN THE PROGRAM LEVEL (1000's)
CEMENT	*BBLS.	58,700	16,000
AGGREGATES	TONS	403,100	76,415
REINFORCED CONCRETE CULVERT PIPE	TONS	2,640	512
CEMENT FOR R. C. PIPE	*BBLS.	2,900	564

Source American Road Builder's Association

(1) These requirements do not include the materials used on highway maintenance.
*BBL.= 376 LBS.

on the pit and quarry industries!

3. *...basic magazine in a basic industry . . . surest way to reach and SELL these producers of cement, sand and gravel, and crushed stone.*



here's how to tap the sales potential of this bigger-than-ever market:

The nation's road building program has shifted into high gear. An estimated $51 billion will be spent on road construction during the next 13 years!

That's a tremendous, ambitious program, representing a phenomenal amount of money. And here are some interesting, additional facts for you to digest:

The pit and quarry industries are NOT part of the construction field . . . but DO supply what it takes (in sand and gravel, crushed stone and cement) to build the nation's roads. WITHOUT THESE BASIC INGREDIENTS, THERE WOULD BE NO ROAD BUILDING AT ALL!

Yes, the pit and quarry industries supply enormous amounts of materials needed for road construction, but even as great as the demand is now, it will have to be increased considerably to keep up with the anticipated road building program. New plants will be built and many existing plants will be expanded to meet the stepped-up demand for road materials for at least the next 13 years. This means that large amounts of equipment will be purchased by these plants.

This is where YOU come in, with the help of PIT AND QUARRY. As the industry's BASIC publication, PIT AND QUARRY is the direct, economical way to tap the growing potential of this market. PIT AND QUARRY offers you the proven medium to sell equipment and machinery necessitated by the expansion and new building of plants to produce more cement, sand and gravel, crushed stone and other nonmetallic minerals . . . all *basic* ingredients in road construction!

For more details about this sales opportunity, write, wire or phone (collect) any of the PIT AND QUARRY offices listed below.

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Also publishers of Pit and Quarry Handbook • Concrete Manufacturer • Concrete Industries Yearbook • Equipment Distributor's Digest

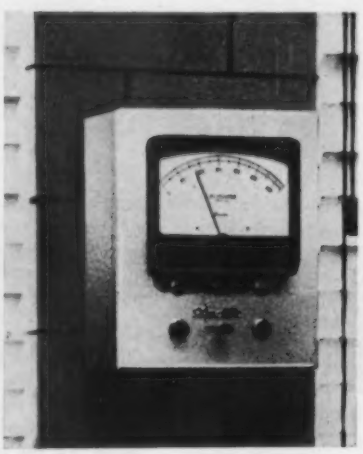
New Machinery

and Equipment

For Further Information Use Card on Pages 101-102

• Brunner & Lay, Inc., has developed a new line of taper-socket type Brunner & Lay Rok-Bits, available in the following gauge sizes: for ⅞-in. drill steel—1¼-in., 1⅜-in., 1½-in.; #7 Class A Taper and for 1-in. drill steel—1⅝-in., 1¾-in.; #8 Class B Taper. Bronze shims are supplied with each bit. According to the manufacturer, there are no threads to strip, and no body distortion from lock-on. The bit is easily removed from the drill rod. **(51)**

• The Magnaflux Y-5 Yoke Kit, a magnetic particle inspection kit available from the Magnaflux Corporation, offers lightness of weight, portability, and low cost. Designed especially for preventive maintenance inspection, for weld inspection, and for limited volume inspection of any magnetic part wherever surface cracks are suspected, the kit can quickly inspect traveling cranes, crane hooks, press frames, lift truck forks, parts of heavy conveyors, shafts, and many structural items. The Y-5 kit is also economical for inspecting parts of equipment in the field, such as booms, winch parts, hooks, and parts of automotive equipment. Weighing less than 30 lb. complete, the kit comes in a metal carrying case. The Yoke itself is the magnetizing and testing instrument, and weighs only 7 lb. **(52)**



• The new Sparton variable remote control system enables both positioning and proportioning plus monitoring of remote equipment over one circuit. Bi-directional positioning is affected by polarized d.c. signals transmitted from a supervisory control panel to a remote slave receiver. Quantitative data on the controlled function is transmitted from the slave unit back to a meter on the supervisory panel. This Sparton system may be used for the remote control of position of operators for valves, gates, loaders, or to affect change in such quantities as speed, power, pressure, flow, water level, pH factor, etc. The control system may be used in conjunction with existing operators or can be supplied complete with reversing motors and pilot operators up to several horsepower. Visible and audible alarm, as well as fail-safe lock-out and hold-out features, can be added. **(53)**

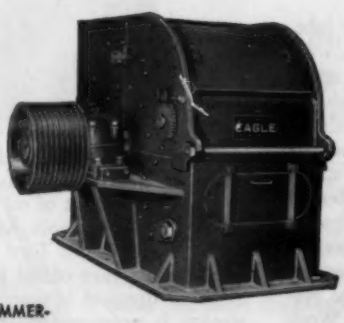
• New bits of the tapered socket carbide insert type, introduced by the Timken Roller Bearing Company, offer several advantages: they can be removed from the drill steel and discarded without throwing away the drill steel; 4-point cross bits give longer life and greater footages between sharpenings; the tapered pin is easily fabricated on the drill steel. New features in design and manufacture contribute to longer drill life, higher drilling speeds, and lower costs per foot-of-hole with new lightweight drilling equipment. New carbides in the cutting edges resist wear. Jet action from the new five front hole design, and the deeper, wider clearance between bit wings allow faster chip removal, improving bit action and increasing bit life. **(54)**

PRODUCE MORE STONE AND GRAVEL WITH MOBILE

Eagle Crushers

Portable Eagle crushing plant operated by Harry Miller Contracting Co., Suffield, Ohio, delivers pit run sand and gravel at rate of 100-125 yds. per hour for cushioning concrete super-highway nearby. Whole layout can be moved as gravel is consumed. (Power source is electric generator set—could be gasoline or diesel direct drive.)

JAW CRUSHERS



HAMMER-MILLS

Eagle Crushers—both jaw type and hammermill—bear the characteristic marks of the experienced manufacturer—simple design, durable construction, ease of servicing. Eagle originated the one-piece, electrically welded frame —has pioneered in the field of portable, compact, crusher plants like the one above.

There is a range of sizes in the jaw crusher—and a variety of styles (skid-mounted, trailer, portable, roadside). Likewise, the hammermill or impact breaker is made in several sizes and for various applications—is particularly well suited to limestone reduction.

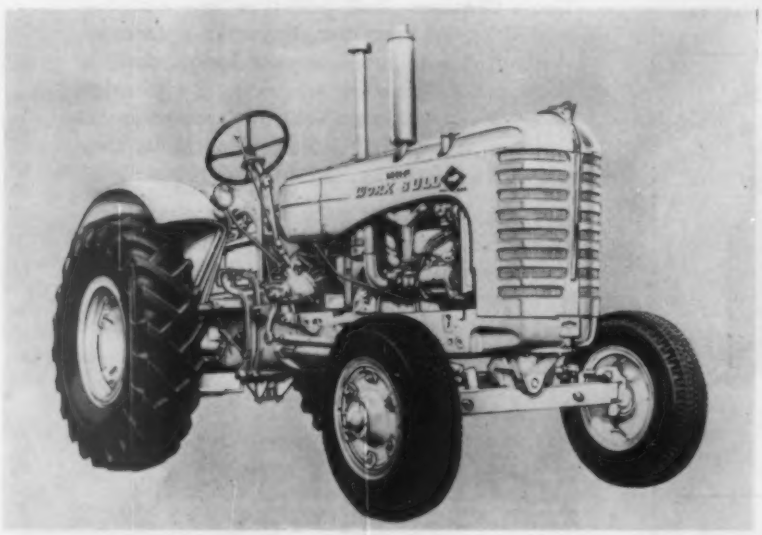
EAGLE

JAW CRUSHERS · IMPACT BREAKERS
PULVERIZERS · CONVEYORS · LOADERS

CRUSHER CO., Inc. GALION OHIO·U·S·A

You are invited to consult our engineers on your crusher problem — no obligation!

• A new, heavy-duty all-wheel drive truck series, engineered and built specifically for gravel hauling, is now available from Oshkosh Motor Truck, Inc. The trucks in this series are designed for year-round use. Powered by either a Continental 427-cu. in. gasoline engine or a Cummins JT-600 diesel engine, they have an 8½-cu. yd. gravel dump body and carry a payload of 18,000 lb. on the front axle. A short wheelbase of 144 in. and Vickers power steering provide easy maneuverability for spotting loads and handling in traffic. **(55)**



• Massey-Harris-Ferguson, Inc., has introduced a new line of light- and medium-duty utility tractors, the M-H-F Work Bulls. Consisting of five tractors and 20 hydraulically-controlled Davis attachments, the new line is adaptable to many applications, including loading, lifting, dozing, trenching, grading, and materials handling. Work Bull models 202, 303, 404, 202 Forklift, and the Davis Pit Bull are recommended as economical and efficient equipment on scattered work-and-run jobs, as back-up machines, and as utility or cleanup tools. Pictured is the M-H-F Work Bull Model 404, the biggest and most powerful tractor in the line. Adaptable to heavier-duty jobs, the Model 404 delivers 52 hp. with its 277 cu. in., high-torque engine, and handles the bigger buckets, loaders, and hoes. In addition to hydraulic control of both tractor and attachments, it features a five-speed transmission, gear-driven differential, heavy-duty front axle and support, worm and sector steering, heavy-duty clutch, full-pressure lubrication, and a 12-v. electrical system. Davis attachments for Work Bull Model 404 include backhoe, loader, dozer, forklift, boom, and scarifier. Attachments are specially built for M-H-F Work Bulls by Mid-Western Industries, Inc. **(56)**

• New "tube rod" electrodes have been specially developed by the American Manganese Steel Division of the American Brake Shoe Company for semi-automatic hardfacing. The new electrodes are 3/32-in. in diameter drawn tubular wire. The tube rod is a round steel-wire shell with the various alloys firmly enclosed within. The steel shell of the wire is work-hardened and prevents any deformation or snarling of the rod during welding. Advantages include high metal deposition, longer wear of parts, and speed and ease of welding. **(57)**

• The Murray sight feed line lubricator automatically feeds and mixes the proper amount of oil to lubricate all air and steam tools. An adjustable valve on the sight feed mechanism controls the rate of oil feed so that either a drop at a time or a steady stream is pressure-fed into the line in the form of an atomized spray. Having no moving parts, the lubricator is of rugged construction, and has a built-in screen to prevent clogging. **(58)**

Shovel-Crane owners!

sharing your profits with old-fashioned clutches?

Remember the day the weather was fine, footing good and the haulers were really rolling...

THAT was the day you thought the job was going to move out ahead of schedule. But the clutches were getting hotter all the time. By mid-morning the dragline went down for clutch adjustment—the heat had done it. After the noon break, the same thing happened. How much production do you figure you were penalized for having a rig with old-fashioned clutches?

Avoid costly downtime

With a Link-Belt Speeder you get modern power, hydraulic-actuated clutches that automatically compensate for heat and normal lining wear. In fact, most Link-Belt Speeder owners will tell you these clutches are so good, adjustment is needed only once or twice a month.

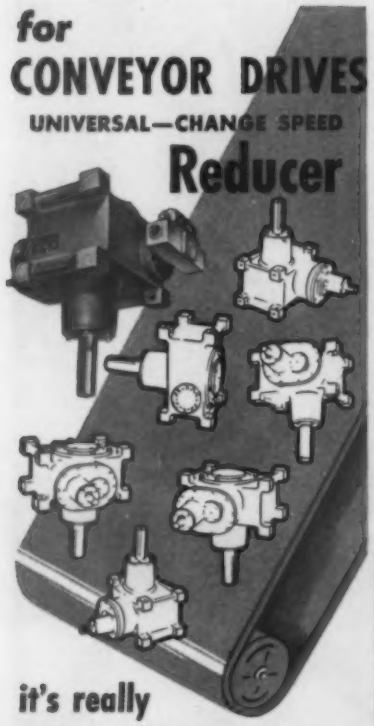
It's just one of many ways you're big money ahead with a Link-Belt Speeder.

Get the complete story from your distributor. He'll show that whatever rigs you need—crawler or rubber-tired . . . ½ to 3-yd, 8 to 60-ton capacity—you'll earn bigger return on your equipment dollars with a Link-Belt Speeder. Or write for literature—LINK-BELT SPEEDER CORPORATION, CEDAR RAPIDS, IOWA. 13,900

LINK-BELT SPEEDER

Builders of a complete line of crawler and rubber-tired shovel-cranes.

for
CONVEYOR DRIVES
UNIVERSAL—CHANGE SPEED
Reducer



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"HVUT"

can be mounted in any of the above positions

The HVUT Units not only offer you complete flexibility of mounting, but very easy change of output speeds—within a matter of minutes, the Helical gear chamber can be opened and gearing replaced to give exact speed change desired. Two separate helical gear sets form the high speed reductions, while the slow speed reduction consists of heavy-duty worm gearing. All gears, bearings, shafts and housings are of the very finest materials, to assure you of efficient, trouble-free, long-lived performance. Another feature—all Units are equipped with the famous Philadelphia "Dry Well" construction which assures a completely dry area around the output shaft, even when the shaft is mounted in a "shaft-down" position.

HVUT Reducers are rugged and absolutely dependable Units, designed and built by one of the Pioneers in Industrial Speed Reducers. They are the ideal drives for most every type of Conveyor, including trolley, floor and pit types—and remember, the HVUT Units are available at low initial cost.

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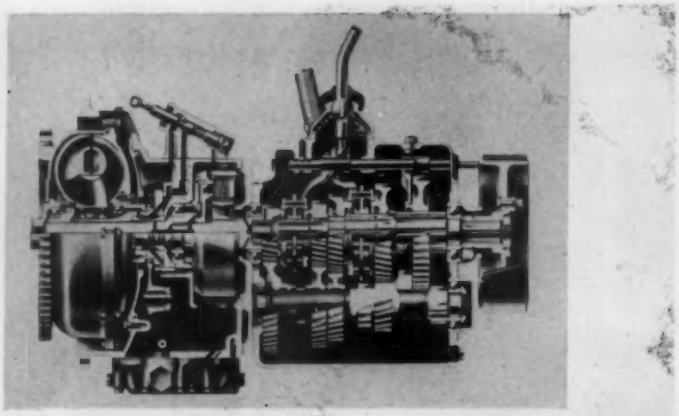
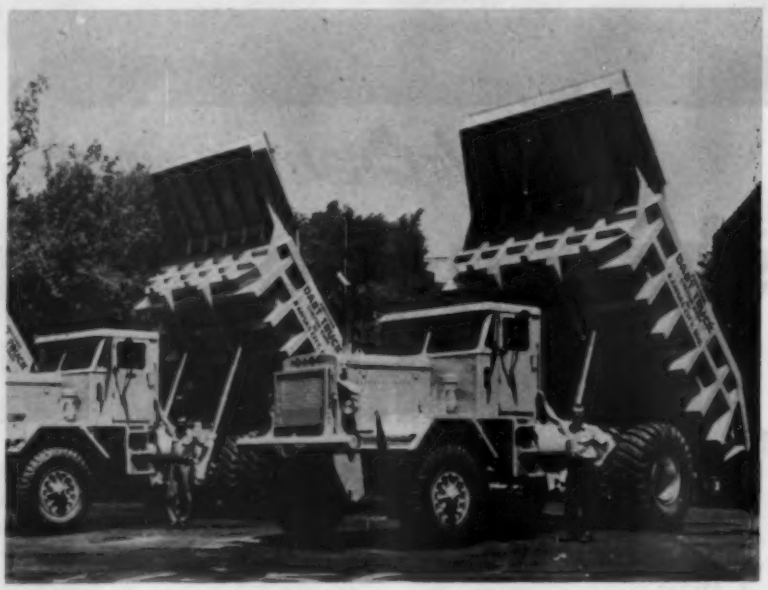
Virginia Gear & Machine Corp. • Lynchburg, Va.



• Compact size, simple, trouble-free components, easy installation, and long service life are features of the TransVerter, a new power train package developed by Clark Equipment Company's Transmission Division. Consisting of a torque converter, hydraulic disconnect clutch, and standard transmission in one unit, the TransVerter is ready for mounting with any standard make engine. Designed specifically for off-the-highway and stop-go operations, the Trans-Verter is particularly adaptable for various types of construction equipment. Operational advantages claimed for the new Clark power train include elimination of engine stalling and lugging; sharp reduction in gear shifting to the point where most work can be performed in the same gear; and fine inching control by simply rocking the throttle. **(59)**



• Model 25SL, a 25-ton end dump truck manufactured by the Dart Truck Company, is powered by a 300-hp. Cummins N.H.R.B.S. 600 super charged diesel engine. The frame is box girder type U. S. Steel welded into box sections by submerged arc welding. The bodies are also of U. S. Steel welded shell construction. Torque converters are Twin Disc model C010,0Q0 driving through Fuller 4MS1440 transmissions with four forward speeds and one reverse. The automatic braking feature retards automatically on downhill grades. Dart's heavy duty drive axle, standard on the Model 25SL truck, is a full floating triple reduction driving axle with double reduction differential, and final reduction, consisting of floating planetary systems, is in each wheel. The components are supplied by a total of 67 manufacturers. **(60)**

Here is a new high in preventing slippage. You can't see Hudson's "Magnetized" coating, or feel it. But it is applied uniformly to every square inch of every surface of the bag. When stacked, "Magnetized" sacks actually clutch each other.

Standard tilt tests show firm holding power up to a 40° angle. Costing only pennies in upcharge, "Magnetized" Multiwalls can save you dollars in usage.

You save in breakage, you save in time, you save in possible injuries. And, most practical, you save in space because *both you and your customers can now stack higher with safety.*

Let us demonstrate this safer finish. Write Dept. 69 for convincing "do-it-yourself" test.

HUDSON Betterbags HAMMOND

HUDSON PULP & PAPER CORP.

477 Madison Avenue • New York 22, N. Y.

Plants at:

PINE BLUFF, ARK. • PALATKA, FLA. • WELLSBURG, W. VA.

VENT LINES
...the Easy Way!

Naylor Spiralweld pipe is "made-to-order" for ventilating jobs in mining service.

Its light-weight makes for easy handling. Installation is fast . . . especially with the one-piece Naylor Wedge-Lock coupling which can be joined with only a hammer. Lines hug the wall . . . can be assembled with only one side of the pipe in the open . . . and extended readily as work progresses.

You save money, too, because the greater collapse strength inherent in the Naylor structure permits the use of lighter gauge material without sacrifice of performance.

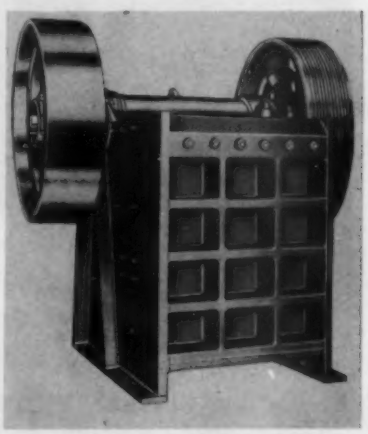
Write for the complete story. Ask for Bulletins No. 507 and No. 514.

NAYLOR PIPE

NAYLOR PIPE COMPANY
1257 East 92nd Street
Chicago 19, Illinois

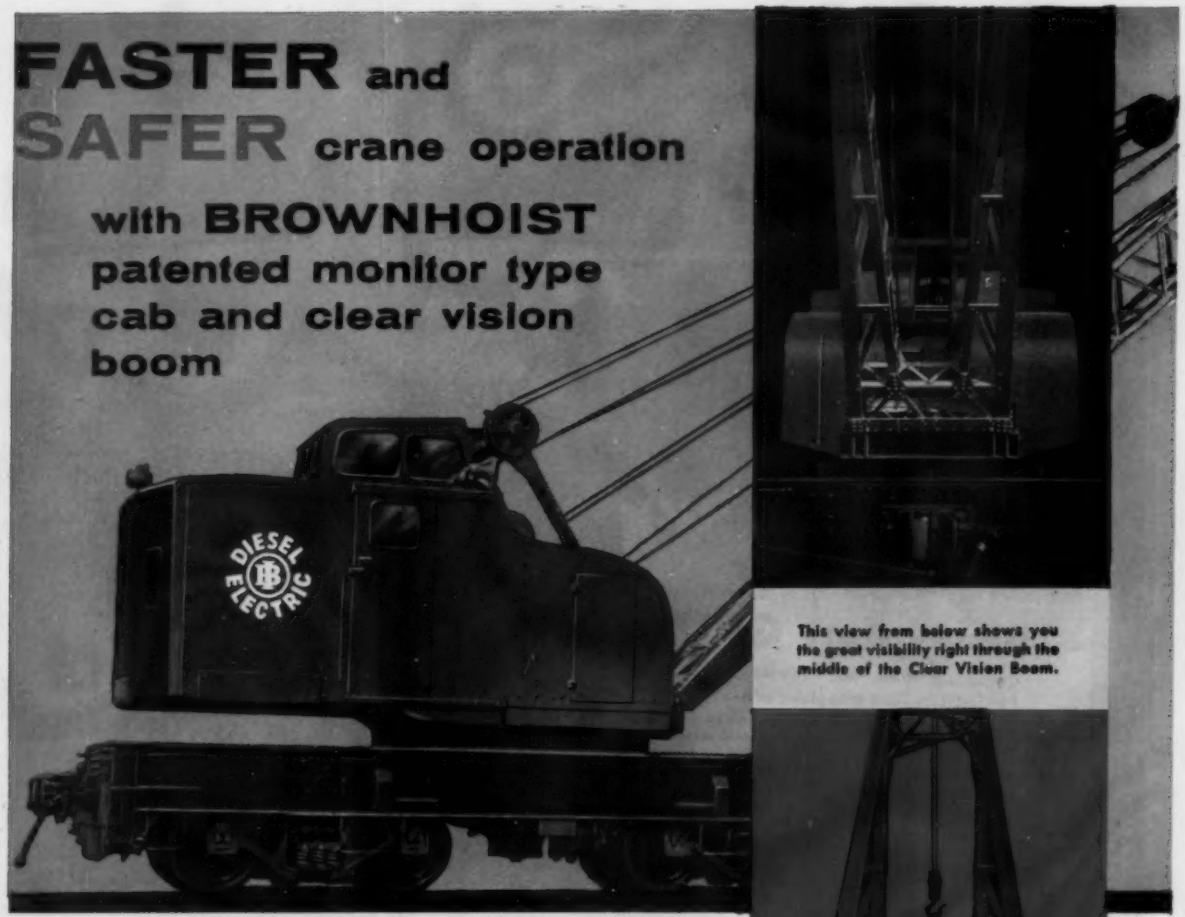
Eastern U. S. and Foreign Sales Office: 350 Madison Avenue, New York 17, New York

• A rubber covered hydraulic hose selector is being offered free to users of hydraulic control hose by the Republic Rubber Division, Lee Rubber & Tire Corporation. The revised selector contains latest S.A.E. and industry specifications on hydraulic hose. Starting with any known factor, a designer or maintenance man can use the selector to determine the proper Wiretex rubber covered hydraulic control hose for his needs. **(61)**



• A series of high-capacity jaw crushers of the overhead eccentric type are now available from the McLanahan and Stone Corporation. McLanahan Jawmaster crushers are produced in 13 sizes ranging from 10 by 16 in. to 40 by 48 in. Capacities up to 750 tons per hour are offered. Features include roller bearing construction throughout and an extra heavy welded steel frame. Design of the Jawmaster permits operation at close allowable discharge settings to produce a highly uniform product. **(62)**

FASTER and SAFER crane operation with BROWNHOIST patented monitor type cab and clear vision boom



This view from below shows you the great visibility right through the middle of the Clear Vision Boom.

Windows on all sides of the raised Monitor Type Cab of a Brownhoist Locomotive Crane give the operator a full view of the area in which he is working, and the open type Clear Vision Boom lets him look right down at the work itself. This complete 360° visibility—to the sides, to the rear, and forward into the car—allows the operator to work more rapidly, without unnecessary crane swinging, and also increases safety by eliminating blind spots. The patented Monitor Type Cab has a door on each side, and all doors and windows can be opened for ventilation. A soundproof partition separates the operator from the engine and controls are placed within convenient reach of his adjustable seat. These factors assure ease of operation of the Brownhoist Locomotive Crane, and Brownhoist engineering assures maximum performance. Anti-friction bearings are used throughout including machinery side frames. The boom hoist is worm driven for smooth, safe operation. Dynamatic clutches disconnect all upperworks when travelling . . . give sure, positive control. High strength alloy steels bulwark the machine for heavy service. Throughout, Brownhoist Locomotive Cranes are designed and built for high capacity production. For further information write today for Catalog No. 548.

Approximate visibility from ordinary cab.

Approximate visibility from side-operated cab.

360° visibility from I. B. patented Monitor Type Cab.

Your operator can see exactly what he's working with in the car in front of him. Greater safety is the result.

188

BROWNHOIST MATERIALS HANDLING EQUIPMENT GIVES A LIFT TO AMERICAN INDUSTRY

INDUSTRIAL BROWNHOIST CORPORATION
BAY CITY, MICHIGAN • DISTRICT OFFICES: New York, Philadelphia, Washington, Cleveland, Chicago, San Francisco, Montreal • AGENCIES: Detroit, Birmingham, Houston

SUBSIDIARY OF Power-Traction

BROWNHOIST

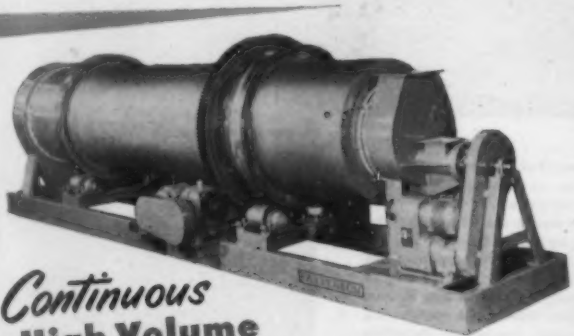
PATTERSON

SATISFACTORY MACHINERY FOR—

Continuous

Heavy Duty GRINDING

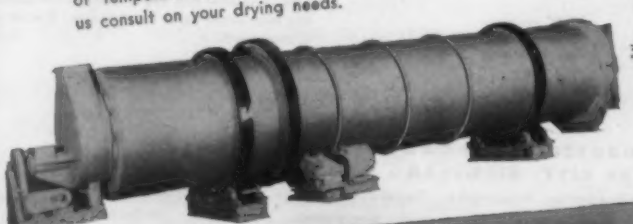
Continuous feed and continuous discharge with the PATTERSON Tube Mill provides steady grinding production under the most rugged conditions—at record lows in cost! **Write us.**



Continuous

High Volume DRYING

PATTERSON Rotary Dryers give you uniform drying of materials with continuous feed and discharge, exact control of temperatures, and excellent operating economy. Let us consult on your drying needs.



The Patterson Foundry and Machine Company

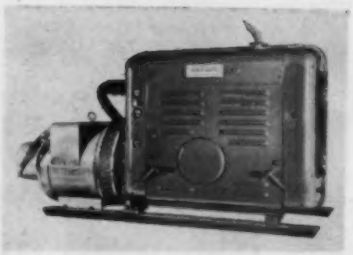
East Liverpool, Ohio, U. S. A.

NEW YORK, BOSTON, BALTIMORE, PHILADELPHIA, PITTSBURGH, DETROIT, CINCINNATI, CHICAGO, ST. LOUIS, HOUSTON, DENVER, LOS ANGELES, SAN FRANCISCO, SEATTLE

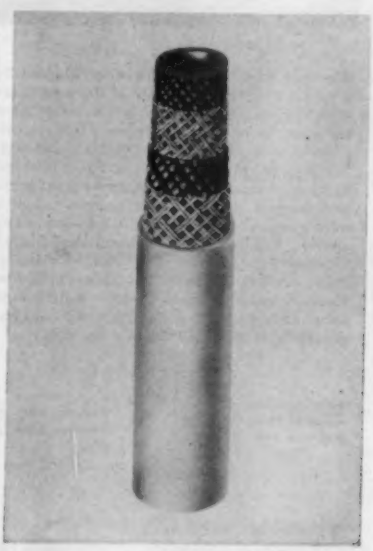
The Patterson Foundry and Machine Company, (Canada) Limited

Toronto, Canada

MONTREAL



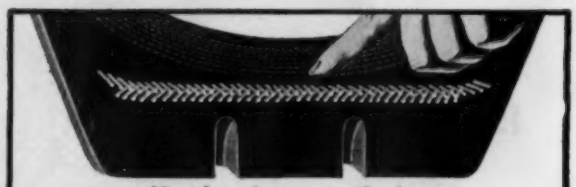
• Two new groups of gasoline electric plants have been added to Gen-A-Matic Corporation's line of generators. Both air- and water-cooled models, with ratings from 400 to 75,000 watts, are available, as well as three separate lines of diesel electric plants ranging from 10,000 to 300,000 watts. Both Gen-A-Matic portable electric plants, ranging from 850 to 5,000 watts, and the non-diesel plants now being introduced are available with automatic and semi-automatic control apparatus for special applications, and any desired control configuration may be specified. With these new electric plants, the Gen-A-Matic line includes more than 200 models so that all requirements in electric power generators can be filled from standard production line models. **(63)**



•Duraprene, the newest addition to the complete line of air hose produced by the Hamilton Rubber Manufacturing Corporation, is a light-weight, two-braid hose available in sizes up to ⅜ in. Because it is oil-resistant, Duraprene is applicable to a wide range of industrial uses where air pressures of up to 200 p.s.i. are encountered. **(64)**

Invulnerable

to cuts and ruptures in the tread area!



Here's why... exclusive

SAFETY STEEL SHIELD*

Here, between tread and cord body, are thousands of cords of flexible steel. This Safety Shield is invulnerable to cuts and ruptures for original tread life *and* extra recap life!

**Patent Applied For*

U.S. ROYAL *Super* FLEETMASTER

You are looking at a new kind of on-and-off-the-road truck tire. It is so *immune* to road hazards it runs over razor-sharp axblades without losing a pound of air. It has the deepest tread U. S. Royal has ever built into this type of tire. It is so *versatile* it outperforms on any wheel—gives greater stability on front wheels, increased traction on drive wheels, extra recaps on trailing wheels.

For dump trucks, transit mixers, log haulers . . . on any rig exposed to heavy impacts, tire-killing terrain. You'll enjoy fewer tire failures, less down-time expense, greater service dependability.

In sizes through 11.00. See your U. S. Royal Dealer . . . or write Truck Tire Department. You can specify "Super Fleetmaster" on your new equipment.

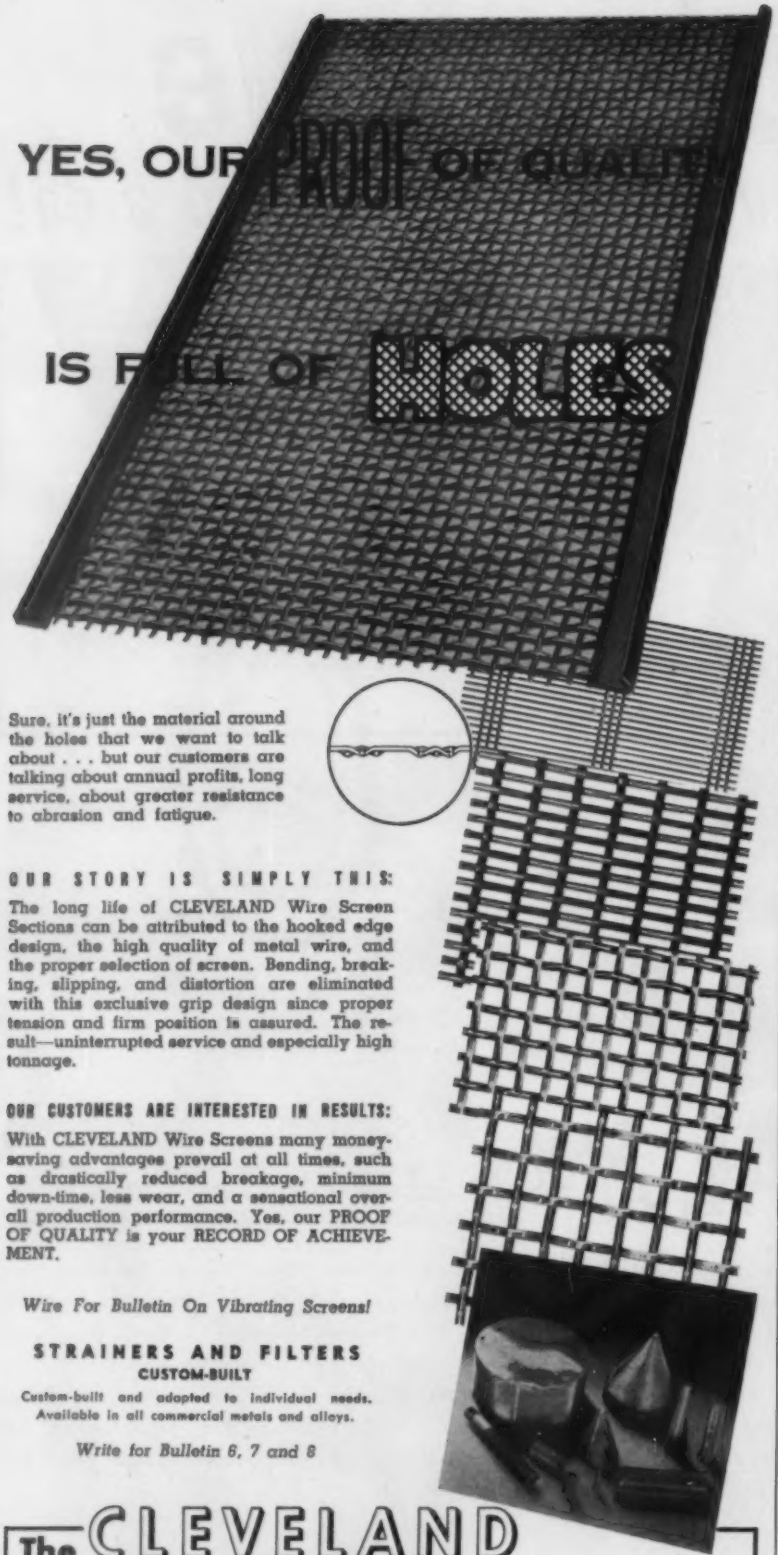
US RUBBER

United States Rubber

Rockefeller Center, New York 20, N. Y.

YES, OUR PROOF OF QUALITY

IS FULL OF HOLES



Sure, it's just the material around the holes that we want to talk about . . . but our customers are talking about annual profits, long service, about greater resistance to abrasion and fatigue.

OUR STORY IS SIMPLY THIS:

The long life of CLEVELAND Wire Screen Sections can be attributed to the hooked edge design, the high quality of metal wire, and the proper selection of screen. Bending, breaking, slipping, and distortion are eliminated with this exclusive grip design since proper tension and firm position is assured. The result—uninterrupted service and especially high tonnage.

OUR CUSTOMERS ARE INTERESTED IN RESULTS:

With CLEVELAND Wire Screens many money-saving advantages prevail at all times, such as drastically reduced breakage, minimum down-time, less wear, and a sensational overall production performance. Yes, our PROOF OF QUALITY is your RECORD OF ACHIEVEMENT.

Wire For Bulletin On Vibrating Screens!

STRAINERS AND FILTERS
CUSTOM-BUILT

Custom-built and adapted to individual needs. Available in all commercial metals and alloys.

Write for Bulletin 6, 7 and 8

The CLEVELAND
WIRE CLOTH & MFG. Co.
3576 E. 79th Street • Cleveland 5, Ohio

• The Vibron shock column vibrator, a new device developed and manufactured by the Burgess Sterbentz Corporation, speeds the flow of wet or stuck materials in rigid bins, chutes, and hoppers. Claimed by the manufacturer to eliminate bolt breakage, the new vibrator features a high strength one-piece body, incorporating a high compression drive and a new shock column impact system. The use of a Vibron high compression cycle in place of conventional air cushioning to drive the piston against the anvil increases the power of each stroke. Maximum impact against the anvil is assured through the full utilization of the Vibron shock column design plus improved methods of precision machining. **(65)**

• Production of a new plastic insulation, called Franco-Therm, has been announced by the J. H. France Refractories Company. Intended for application where easy workability and tight adherence is required, Franco-Therm is recommended for use to 1,800 deg. F., dries white, has low thermal conductivity, and is resistant to abrasion, vibration, impact, and rust. **(66)**

1947 . . . the Barber-Greene Loader photographed when it started cutting costs for Lake Shore Sand & Stone Co. in Milwaukee.

1956 . . . the same loader still going strong after nine years of hard use . . . still saving loading time and costs.

"Our Barber-Greene has loaded a half million tons with no appreciable wear!"

H. F. Runkle, Vice President, Lake Shore Sand & Stone Co., Milwaukee

In his 40 years' experience in the sand and gravel business, Mr. Runkle reports that "nothing can equal a Barber-Greene for stockpile loading."

"We bought our newest B-G Loader back in 1947. Since then it has handled more than 50,000 tons a year with no major repairs and no appreciable signs of wear. We plan to get another 82-A this year to replace our oldest Barber-Greene which has been in continuous service since 1936."

Good design and rugged construction make it difficult to wear out Barber-Greene Loaders. Year after year they provide the cheapest and easiest way to load trucks from stockpile, bank or windrow. Crawler mounted for sure footing, the versatile loader handles bulk materials in one continuous, high-capacity flow. Easy to operate controls let drivers load their own trucks and reduce costly waiting time.

Other Barber-Greenes include the 543 Pneumatic-Tired Loader with swivel conveyor, and the 550 Windrow Loader.

Write for literature on any model in the cost-cutting loader line

56-19-BL

See you at the ROAD SHOW

Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

Rip-p-p ...and it's open!

Give your customers the time- and labor-saving benefits of Bemis RIPP-NIPP* in Bemis Multiwall Bags. They'll thank you for it... and RIPP-NIPP costs you nothing extra.

Get the details from your Bemis Man.

RIPP-NIPP—A small, closely controlled, machine-made nip cut in the bag at the edge near the sewn seam to start easy tear along the top. Does not weaken the bag.

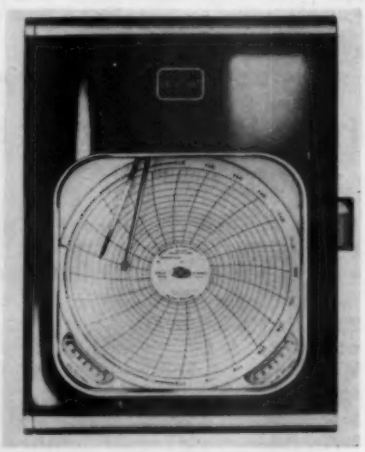
*Trade-mark

Bemis

BEMIS BAG CO.

General Offices — St. Louis 2, Mo.
Sales Offices in Principal Cities

• New, oversize back-rippers for Caterpillar D9 tractors have been introduced by Preco Incorporated. The rippers are available for Caterpillar No. 9S straight blade bulldozers. The rippers are comprised of four housings with pivoted shanks capped with lock-on teeth. The housings are welded to the reverse side of the straight blade moldboard. The outer back-rippers dig into the ground approximately 18 in. as the tractor backs up. The inner shanks rip to a 12-in. depth. The outer shanks can be raised to a 12-in. ripping depth, also. **(67)**



• A new series 500 air controller, manufactured by The Bristol Company, features high stability of control action without loss of sensitivity, and a wide proportional band. Control modes available include narrow band, proportional, reset, derivative, and reset plus derivative. Other features include full zero derivative setting on triple mode controller, easy reversal of action, and a precision linkage arrangement allowing complete disassembly and recalibration with only one adjustment. **(68)**

HERE'S PROOF!

GENERAL

STRONGER-THAN-STEEL

NYGEN® TIRES

save more money per hour on any job!

GENERAL L. C. M. 24 PLY 16.00-24/25
vs COMPETITIVE BRANDS*

COST PER TIRE HOUR OF SERVICE

AVERAGE COMPETITIVE	.259
GENERAL LCM NYGEN	.224

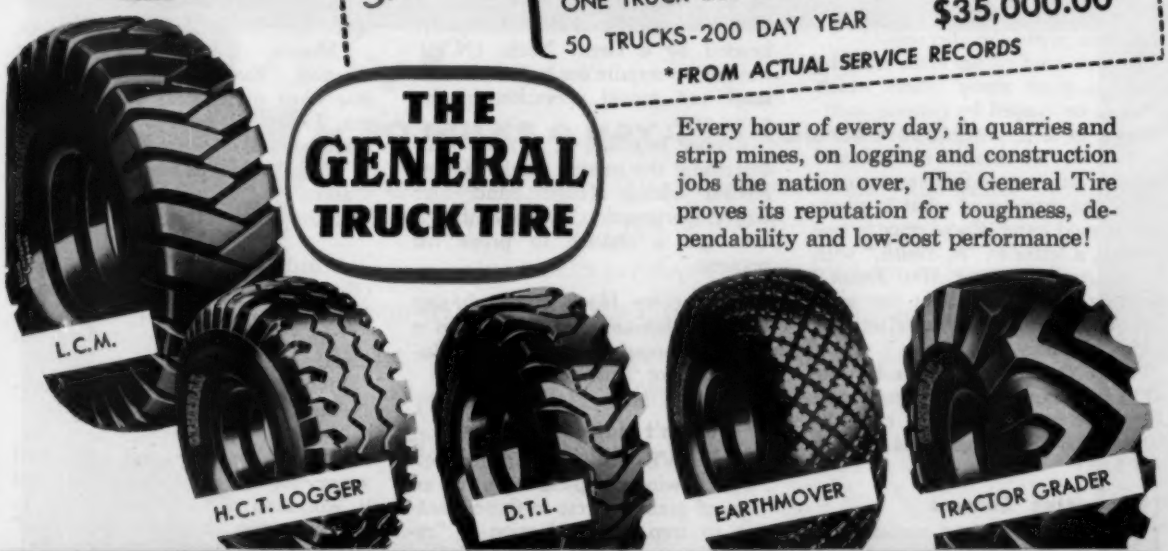
SAVINGS

PER TIRE PER HOUR	$... .03½
PER HOUR 10-TIRE TRUCK	$... 0.35
ONE TRUCK 10-HOUR DAY	$... 3.50
ONE TRUCK 200 DAY YEAR	$... 700.00
50 TRUCKS-200 DAY YEAR	$35,000.00

*FROM ACTUAL SERVICE RECORDS

THE GENERAL TRUCK TIRE

Every hour of every day, in quarries and strip mines, on logging and construction jobs the nation over, The General Tire proves its reputation for toughness, dependability and low-cost performance!



THE GENERAL TIRE & RUBBER COMPANY • Akron, Ohio

Screenings

by Ray L. Smith Jr.

"MAN WHO signs with eyes shut will some day have red face." So might Confucius have made his gift to this column. You will recall the man who dictated, "Your talk Governor, was a most *honorable* explanation of the problem," and later signed the letter as he dashed off for a round of golf. There can be no doubt about the color of his face the next morning when he saw on the carbon copy, "Your talk Governor, was the most *horrible* explanation."

This actually happened, but the typist was not so much to blame as the dictator. Typing at high speed from shorthand tends to become mechanical, and it is easy to transcribe the wrong word as the girl concentrates more on her notes than on thought content. To be sure, a top-flight secretary should try to check her own work, but often she is given dictation at a late hour and is expected to get the letters in the mail before leaving. Under pressure, the mistake-potential increases. In any event, responsibility for correctness rests with the dictator.

To this kind of an error may be added a great many others which seem to be caused by general indifference to sloppy or careless work, particularly inaccuracies in name and address. Any one of these errors may defeat the purpose of what is otherwise a good letter. Came once to our address, a letter to *"R, Smith,"* with the salutation, *"Dear Mrs. Smith."* Nothing said later about the services of the company could offset such a dumb start.

There can surely be no substitute for correctness in a business letter. Is it not better to check carefully before you sign than to later wish you had?

Typewritten Success

IF WE didn't have a success story to pass on to you now and then, we'd feel that things were pretty unsuccessful.

This one tells of the eager young man, recently graduated from Stanford University and of his job interview with Louis Jannin. He wanted to become a mining engineer, the young man said, and he considered Jannin's office the best place to perfect himself.

"All I need at the moment," said Jannin regretfully, "is a stenographer."

"A stenographer?" repeated the applicant. "I'll take the job. I can't come in for a few days, but I'll start Tuesday."

When the new employee reported to work on Tuesday, Jannin was curious. "Why couldn't you start until today, since you were so eager to work for us?"

"I had to rent a typewriter and learn to use it," he explained.

"I think you'll do," Jannin exclaimed. "What did you say your name was?"

"Herbert Hoover," was the reply.

Nomenclature

WE SUPPOSE some irresistible attraction must have caused a New York sand and stone company, headed by a Great Neck, (N.Y.) resident to acquire control of another sand and gravel operation in the same area.

Banner headline of a news item describing the merger reads, "Great Necker Heads Huge Sand and Gravel Corporation." Wonder if he'll ever get a chance to prove his prowess.

A concrete block truck chasing about Kalamazoo, Mich., carries a sign that reads, "Here Comes Indigestion for Termites."

It shouldn't Happen

WE'VE just received the following complete report on an item of great interest to those wanting to step up production,— "recent survey on office work habits reports that typists who chew gum are 17 percent more efficient than those who don't." Maybe so, but we wouldn't like it. Can you imagine a row of darlings blowing bubble gum in cadence with their typewriters?

Potpourri and Succotash

The teacher was greatly surprised to see Tommy still outside the school door thirty minutes after school was dismissed.

"What's the trouble, Tommy?" she asked.

"I'm afraid to go home. We have a new baby at our house and I know my father will scold me. I always get blamed for everything."

A young smart-aleck sauntered over to the table and patted Sam's very bald head.

"You know," he said, "your head is so soft and smooth, it feels just like my wife's leg."

Sam reached up, patted his own head and replied, "Darned if it don't!"

The wife wanted to do something during the day, so at breakfast she asked her husband for ten dollars.

"Money, money, money!" he shouted. "Every day of the week you want more money. If you ask me, I think you need brains more than you need money."

"Perhaps so," his wife agreed, "but I asked you for what I thought you had the most of."

A little old lady handed the post office clerk a package containing a Bible.

"Anything breakable in this?" he asked.

"Nothing but the Ten Commandments," the little lady replied.

An English lady, self appointed supervisor of village morals, accused a workman of having reverted to drink because "with her own eyes" she had seen his wheelbarrow outside a public house. The accused made no defense, but that evening placed his wheelbarrow outside her door and left it there all night.—

90 MILES A DAY — THROUGH ROCK !

Hughes bits are drilling through rock formations — the world-over — at the combined rate of over 20,000 feet per hour . . . or more than 90 miles per day. This rate has been increasing from year-to-year. In the span of 46 years, Hughes rock bits have been used to drill more than a *billion* feet of hole. The high penetration rate of HUGHES rock bits and the footage drilled per bit reflect this world-wide rock bit experience.

SUPER-TEMPERED
PRECISION SPACE SCREENS

assure greater tonnage output at a lower cost

To the casual observer, one space screen is pretty much like another. But, in terms of downtime, output and screen life, basic differences are readily apparent. That is why Super-Tempered Space Screens have long been standard on difficult jobs where costs are a determining factor.

These screens are made from special super-tempered wire, heated red-hot and oil quenched for extreme hardness. They are then tempered in molten lead to obtain the toughest structure possible. Finally, they are precision crimped and woven on powerful hydraulic looms to insure accurate, uniform spacing that withstands the severest vibration.

This superior screen offers you peak performance with positive savings on even your most demanding jobs. To order, write or phone your requirements to our nearest sales office.

C F & I SPACE SCREENS
THE COLORADO FUEL AND IRON CORPORATION

CF&I

3331

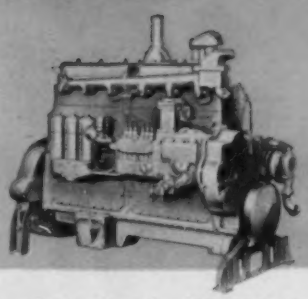
THE COLORADO FUEL AND IRON CORPORATION: Albuquerque • Amarillo • Billings • Boise • Butte • Casper • Denver
El Paso • Ft. Worth • Houston • Kansas City • Lincoln (Neb.) • Los Angeles • Oakland • Oklahoma City • Phoenix
Portland • Pueblo • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane • Wichita • WICKWIRE SPENCER
STEEL DIVISION: Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia
CANADIAN OFFICES AT: Calgary • Edmonton • Vancouver • Winnipeg

PROOF OF PERFORMANCE!

After 8 years' experience with a D13000, "nothing but another Caterpillar Engine" was considered by the Wenonah Sand & Gravel Co. for its second dredge

This CAT* D13000 Engine drives a 6" pump in a hydraulic sand dredge, operated by the Wenonah Sand & Gravel Co., Wenonah, N. J. There's a 70-foot lift through 600 feet of pipe to the wash tower. The engine, purchased several years ago, is the company's second D13000. According to Earl T. Kroll, Chief Mechanic, here's why: "Having used a duplicate of this engine in another dredge since 1946 with unquestioned economy and reliability, when we wanted to put another dredge into service, there was nothing but another Caterpillar Engine for us, a choice we haven't regretted."

This is just one of thousands of cases where the performance of one Caterpillar Diesel has sold another. There's a reason. These rugged units, available up to 650 HP (maximum), pay off in dollars and cents *on the job*. Simple to operate, they need a minimum of attention and maintenance. And they're sturdily built for a long life of low-cost use in *every* type of construction equipment. What's more, your Caterpillar Dealer stands back of them with prompt, capable service whenever and wherever it's needed!



NOW IN THE CAT POWER LINE-UP: THE NEW D342, AN EVEN MORE EFFICIENT UNIT!

Replacing the D13000, the more powerful, more compact 6-cylinder D342 delivers 210 HP (maximum). And with Caterpillar 4-cycle design, the fuel system requires no adjustment and there are no air boxes or cylinder ports to clean. Your maintenance is reduced to a few minutes a month for oil and filter changes. For complete information about this and other modern heavy-duty engines, see your Caterpillar Dealer.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

MODERN HEAVY-DUTY DIESEL POWER

producers deadline for the New

By BUREN C. HEROD

Over 75 percent of the aggregates required in the turnpike construction were supplied from plants, predominantly portable, operated by paving contractors and sub-contracting aggregate producers at the above locations.

meet specifications, with impressive tonnage

Kansas Turnpike

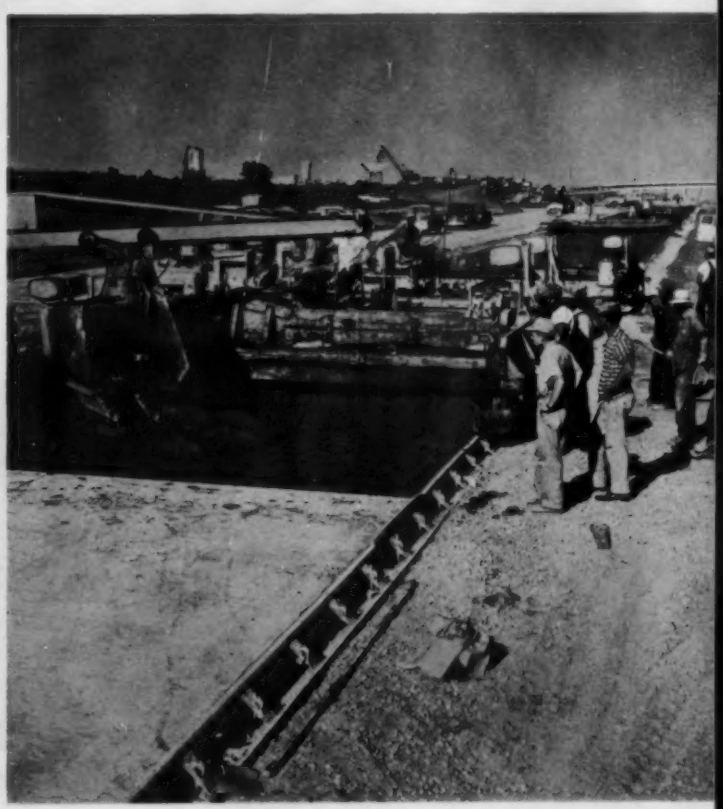
Another ON THE SPOT Report

AMONG industry producers, proponents of an extended highway system, and legislative bodies concerned with the program for developing the nation's highway network, there have been instances of pessimism in regard to the availability and quality of the basic material — aggregates — for some sections of that precedent-breaking project. Now that attitude can well be revised in view of the record surrounding the construction of the new Kansas Turnpike, a 236-mile toll super-highway, scheduled to open to traffic on October 15, that required more than 12,000,000 tons of base materials and aggregates—an average of nearly 52,000 tons per mile.

Here in eastern Kansas, a southwesterly route from Kansas City, through Topeka, to Wichita and the Oklahoma line has been constructed through an area not generally considered overly-endowed with materials that would qualify under modern highway design. However, more than 30 operators moved in along the route of the turnpike, and with the minimum of difficulty located limestone and sand and gravel deposits of sufficient size to provide the large tonnages required by the various contracts, and of a quality that would meet the turnpike design—despite the fact that the latter is a strong reflection of the trend toward increasingly rigid specifications.

True, there were problems. Faced with firm control in gradation, compaction, and plastic limits, operators encountered some difficulty due to the relatively "soft" nature of some of the limetsone country rock, along with weathered strata in the upper sections of many formations and contamination from clay topsoil or clay-filled fissures in both limestone and sand and gravel deposits. However, these conditions are often found in areas considered more favorable to commercial pit and quarrying operations, and were readily handled by the turnpike contractors through selection of equipment and adjustment of processing flow. While nearly 35 aggregates processing plants were involved in producing turnpike materials during the last ten months, only about one-third were previously established commercial operations with stationary facilities; and of that number, all but one were within 100 miles of the eastern terminus. Portable plants were installed at various points along the turnpike route by 15 subcontracting aggregate producers, including several who have permanent plants in other areas and many who specialize in using portable units to supply materials for successive highway construction jobs.

In addition to the foregoing, most



← In this aerial view of the turnpike route near Bazaar, the base course stone is in place on one-half of the divided highway. The overpass was provided for cattle transport to pens which will be located at the right and lower center.

Portland cement concrete, being placed → here, was used on a 55-mile section between Topeka and Kansas City.

An unusual practice of using three pavers in tandem is shown here as the San Ore firm places asphalt on one section of its contract.

of the 16 firms that contracted for paving on the turnpike also installed portable plants; and along with those operated by the subcontracting producers, these units accounted for more than 80 percent of the output of required aggregates. The remaining contractors acquired all of their materials of this type from producers with established pits and quarries in the Kansas City, Lawrence, and Topeka areas. The majority of all plants, both portable and stationary, were predominantly equipped with Cedarapids units.

The magnitude of the job performed by the pavers and associated aggregate subcontractors is highlighted by the fact that virtually the entire tonnage of aggregate required was produced and laid since this spring—enough material to provide a road base 24 ft. wide and nearly 500 miles long.

TURNPIKE PLANNING

The numerous scenes of well-ordered but intense activity along the turnpike, as the contractors head for the homestretch and the deadline, had their origin a relatively short time ago—April 7, 1953. On that date the Kansas Turnpike Act was passed by the state legislature. Less than a year later the Kansas Turnpike Authority created by the act received a preliminary report from engineering firms retained for the purpose on the feasibility of the proposed super-highway and its probable construction cost.

Subsequently, the firm of Howard. Needles, Tammen & Bergendoff, who performed the preliminary cost survey, were retained as the general consulting engineering firm for the turnpike construction. Following the final reports by traffic and cost engineers, which indicated a cost of $160,000,000, and the delivery of the authorized turnpike bond issue, the project began to move rapidly.

By December, 1954, construction awards were being let. At the end of 1955 all of the earthwork and drainage on the project was under contract and over one-third of that work accepted from the contractors as complete; all of the 235 bridges required had been let, actual construction having been started on all but two of those structures. Starting in July, the entire paving program for

The use of contrasting-colored surfacing is shown here in a view of a section of rigid pavement, except for the medial strip.

This view shows a portion of the completed asphaltic concrete flexible pavement. Only the shoulders and the center strip remain to be finished.

the 236 miles was awarded within a period of four months.

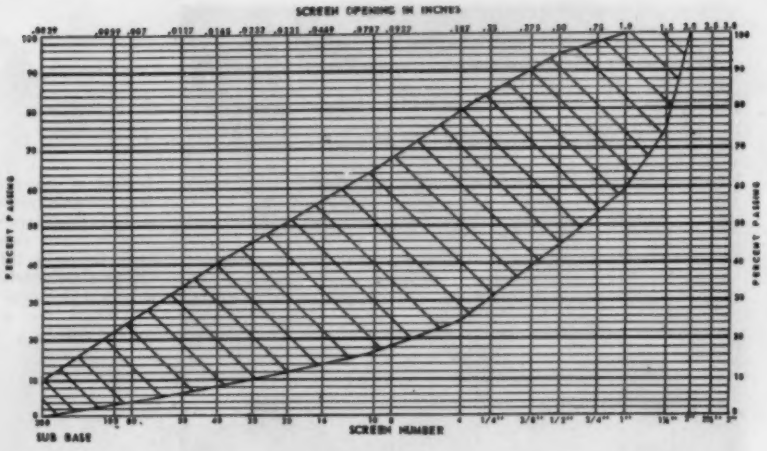
In order to facilitate administration, contract awarding, and construction, the project was divided into 43 sections, each section including awards for the same four types of construction — earthwork and drainage, bridges, paving, and fencing. This division made it possible to have similar construction progressing simultaneously along the length of the turnpike.

SURFACING FEATURES

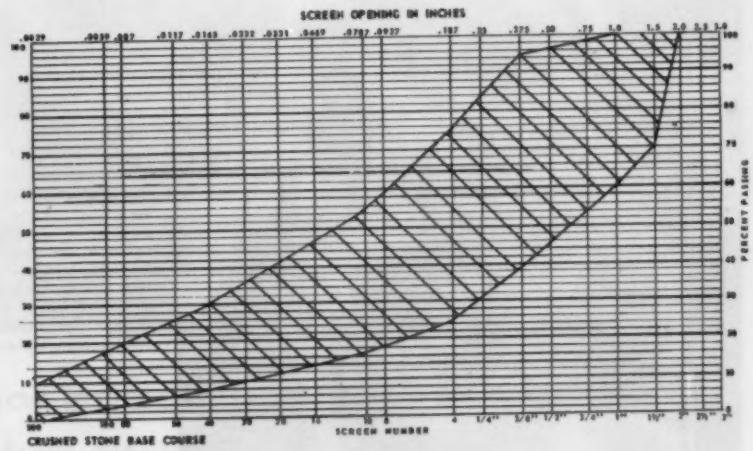
The type of surfacing to be used, *i.e.*, flexible or rigid, was determined only after considerable study and numerous hearings for proponents of both types of paving. As pointed out by Ross C. Keeling, project engineer for the general engineering consulting firm, and former Kansas state highway official, the decision was based on a survey of soil conditions and an extensive study of the availability of materials in which geologists of the state highway department participated. These efforts revealed that materials, soils, and costs were more favorable for the use of flexible asphaltic concrete surfacing on the 181 miles between Topeka and the Oklahoma border, while for the remaining 55-mile section between Topeka and the eastern terminal at Kansas City, reinforced portland cement concrete was advisable.

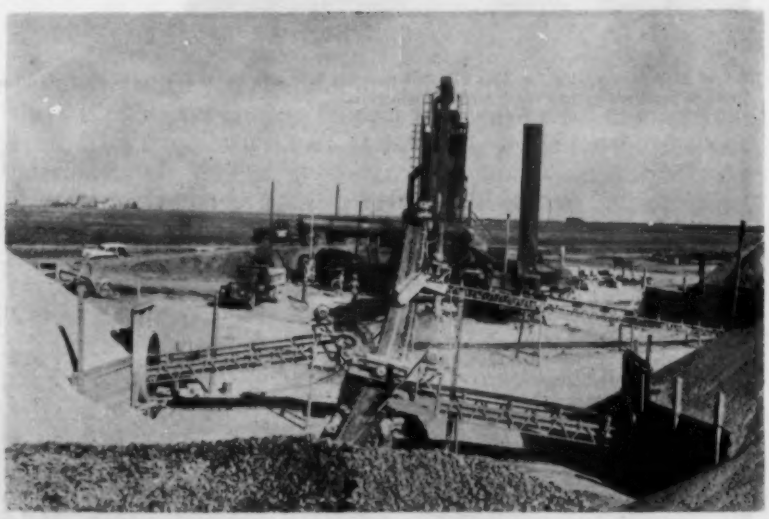
From grade, the flexible type of surfacing includes a 10-in. sub-base covered with an 8-in. base course, topped by a 4-in. leveling and wearing course, for a total pavement thickness of 22 in. The rigid pavement has a 4-in. sub-base with a 1-in. sand leveling course topped by a 10-in. slab of portland cement concrete. While the design of the divided super-highway provides a 24-ft. heavy-duty surface in each direction, separated by a 20-ft. depressed medial strip, traffic will actually have a 38-ft. surfaced roadway since outer and inner bituminous-surfaced shoulders, 10 and 4 ft. wide, respectively, extend from the main pavement. Both shoulder strips, of 2½-in. surfacing, are dropped a quarter of an inch below the main pavement to warn drivers they are off the regular lane.

The poor night visibility attributed to the "black-top" pavement of earlier years will not be a characteristic of the asphaltic concrete section of the Kansas turnpike. This hazard has been eliminated by providing a light-reflecting and skid-resistant surface on the 1½-in. wearing course. Shoulders for each of the two types of pavement are of con-



Graphic representations of the extreme limits of gradation for sub-base (above) and base course materials (below) underlying the 181 miles of asphaltic concrete surfacing.





The main feed belt of this asphalt plant operated by the San Ore firm at the southern end of the turnpike is supplied by reclaiming conveyors (left and right) housed in tunnels made of old tanks with end plates cut off.

Typical of many of the portable power supply installations used in plants along the turnpike are these diesel-electric sets, which supply 220-440 v. for an asphalt facility.

This stationary primary jaw crusher is used by Badger Materials, Inc., near Augusta in conjunction with a secondary double roll crusher and a portable secondary plant.

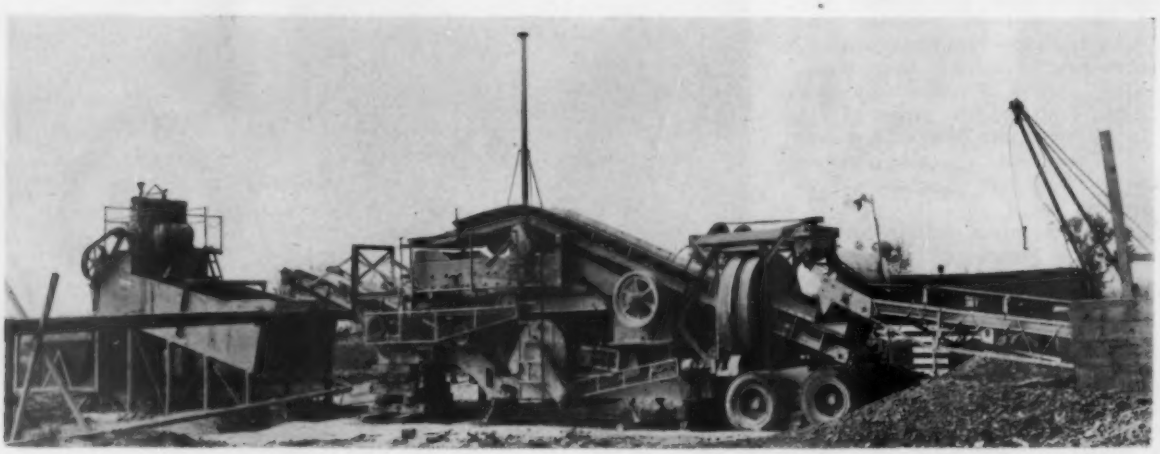
Below: At Arkansas City, San Ore uses this portable unit with the twin screw washer classifier (left) to process aggregates for asphaltic concrete.

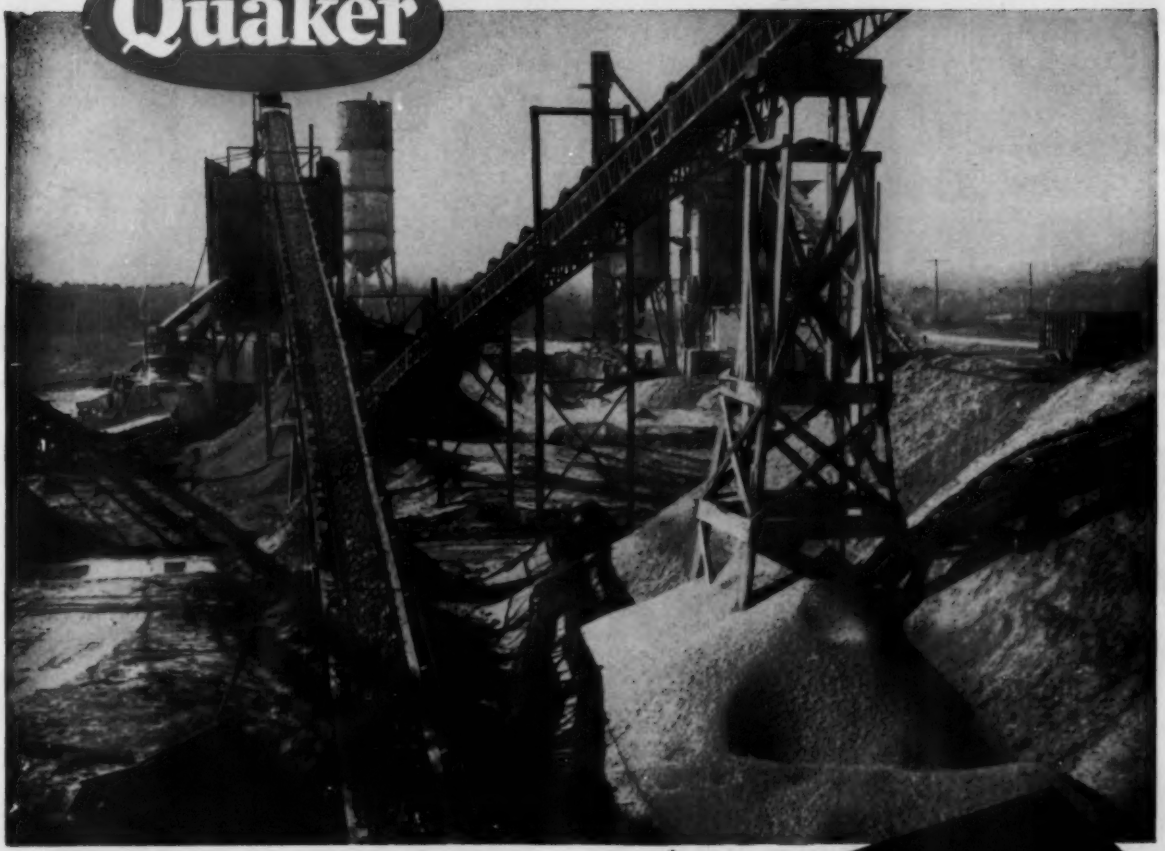
trasting colors to their respective main lanes—dark surfaced along the concrete section, and light with the asphalt. The familiar rhythmic noise heard in passing over filled expansion joints of most portland cement concrete pavements will be minimized on this highway through the use of sawed joints.

While both the rigid and flexible pavement sections of the turnpike have been designed to carry a 36,000-lb. axle load which comprehends a high-frequency 22,400-lb. axle load rate, the maximum legal load on Kansas state highways is 18,000 lb. However, the turnpike engineers based their design on anticipated future changes in traffic frequency, and increased loading due to probable upward revision of legal limits. The study went so far as to take into consideration the effect that truckers' costs would have in limiting payload and numbers of vehicles.

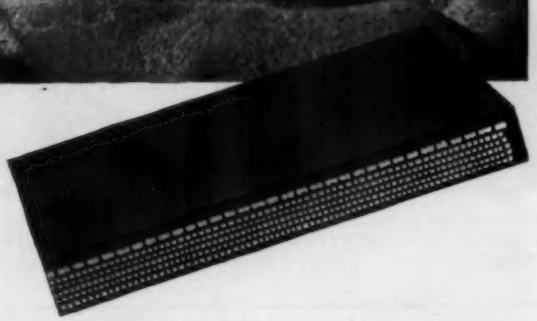
SPECIFICATIONS

Although the specifications for aggregates, along with other construction details, to meet such a design would of necessity be rigid, as Mr. Keeling states, there was no question of revising specifications to meet the materials since the survey made prior to the awarding of contracts had already established knowledge of available materials that would meet the requirements. Actually, the contractors and subcontracting aggregate producers located several convenient deposits, in addition to those already known, from which qualifying materials could be extracted; and the only other factor that posed a problem of any significance in aggregate supply was that of combatting sometimes excessive fines in meeting required gradation represented in the lower ranges of the specifications (see accompanying charts and table).





Takes the impact and roughest abrasion of sharp, jagged loads



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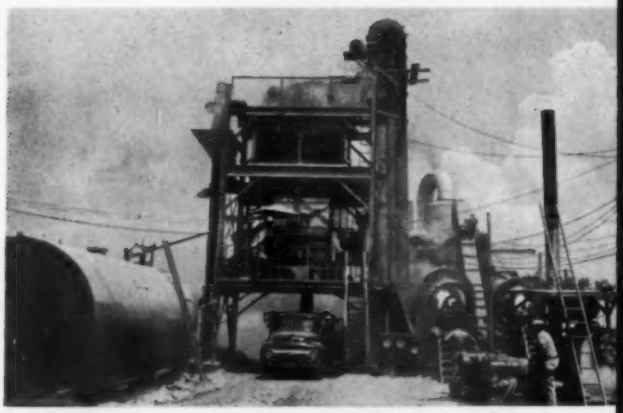
This portable truck scale installation at the Badger quarry is representative of weighing setups used by producers and contractors.



A dual dryer system is used on this asphalt plant, operated by Payne & Dolan, Inc. Aggregates are supplied from the Badger quarry.

A view of the Cameron quarry operated by Reno Construction near Aikman. The portable plant is fed quarry-run stone directly from the shovel, and discharges finished material into haulage units.

The bituminous mixing plant near Chelsea that furnishes asphaltic concrete for the Reno firm.

Extreme Limits of Aggregate Gradation
Percent (by Weight) Passing

Screen	Asphaltic Concrete Surface	Asphaltic Concrete Binder	Portland Cement Concrete
1½-in.	..	..	100
1	..	100	90-100
¾	100	76-100	35- 70
½	86-100	64- 89	..
⅜	..	..	7- 30
No. 4	55- 80	38- 64	..
8	..	..	0.5
10	40- 66	25- 50	..
40	22- 40	12- 28	..
80	12- 26	7- 18	..
200	4- 9	4- 8	..

In general, the deposits operated by the paving contractors to supply sub-base and base course materials did not provide aggregates that would meet all of the requirements for asphaltic concrete as determined by use of several tests, including A.A.S.H.O. water absorption test methods, Los Angeles Abrasion, freeze and thaw, and A.S.T.M. specific gravity tests. The bulk of this material was acquired by rail shipment from commercial quarries in the vicinity of Ottawa and Moline.

As noted previously, the majority of the aggregate-producing operations involved portable facilities, largely of one manufacture, which produced the bulk of paving materials. Since operation of identical or similar equipment was nearly uniform, the following information presented on a number of contractors and their plants provides an acceptable cross-section of the overall aggregate-producing activity along the turnpike.

San Ore Prior to bidding on the 17 miles of paving for sections 1 and 2 at the southern end of the project, the San Ore Construction Company of McPherson, Kans., carried out an exploration program covering a period of about six weeks. As a result of that survey, a main pit furnishing coarser gravels, and two sand pits to supply finer materials were developed. The former is located near Arkansas City, and the latter between that city and the turnpike route about 15 miles west. All materials were trucked to the paving site, separately windrowed, and then blended with a blading unit.

A portable plant operated by George Myers, Inc., in a quarry near Aikman. Note the screen between the dump hopper and the plant.

The main pit, which has very little fine material, was opened last September near the bank of the Walnut River. Removal of about 10 ft. of overburden made approximately 18 ft. of gravel available—8 ft. of which was above, and the remaining 10 ft. below, the water level. A 1½-cu. yd. Marion dragline discharges pit run material to a point from which a pair of bulldozers move it to the Cedarapids processing plant. A Commander portable crushing unit reduces the plus 1½-in. fraction supplied by a pair of horizontal vibrating screens to a top size of ¾-in. for use as asphaltic concrete aggregate. The minus 1½-in. fraction was delivered to the paving site for blending with material from the sand pits. At the height of operations in laying sub-base and base courses, this facility was producing 5,0000 t.p.d. on a 10-hour shift.

In the sand pits, plus 1½-in. material was scalped on horizontal vibrating screens, and the throughs were transported to the paving site. Shortly after San Ore opened the three pits, the firm began its paving operations, which in the two base caurses have resulted in placing approximately 800,000 tons of aggregate. The Arkansas City location furnished 60 and 70 percent, respectively, of the sub-base and base courses, while the sand pits supplied the remainder. It is estimated that there may be another 800,000 tons of material left in the main pit, which may lead the company to establish a commercial operation at that location.

In addition to the aggregates already laid, an estimated 80,000 tons

(*Continued on page* 116)

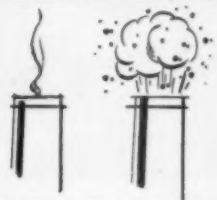
Below: At Emporia, San Ore used these two screening plants in processing gravel for sub-base and base course aggregates. Oversize scalped material here has been stockpiled and is now crushed for asphaltic concrete aggregate.

The Dillon Stone Company operated this equipment in a quarry near Matfield Green. Following exploration, the site was established just a few hundred feet from the turnpike right of way, background.

THE ACL SYSTEM

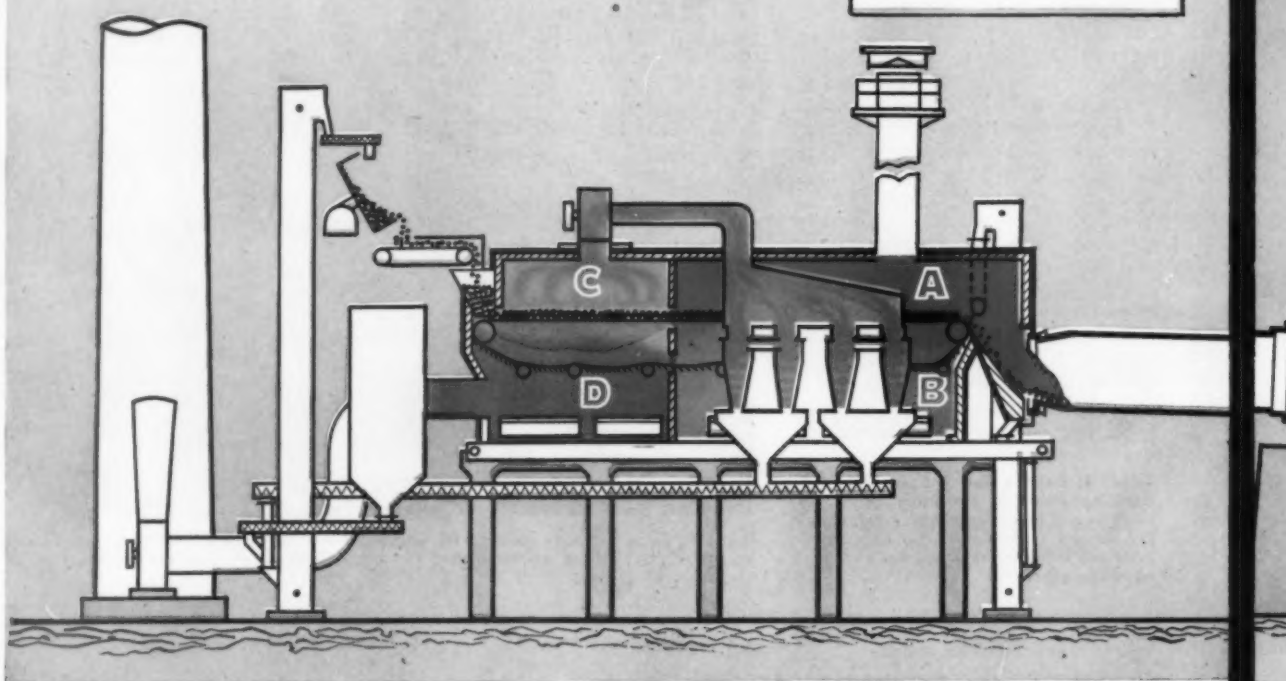
Cuts Cost

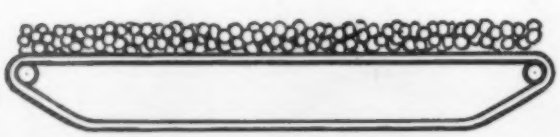
...puts you in a better competitive position—HERE'S WHY



LESS DUST LOSS

Double pass of gases through traveling bed of pellets reduces dust loss below 1% of feed weight without an additional dust-collecting system. Valuable processed material is saved. Dust load of exhaust gas is lower than in any other system.





Traveling Grate Affords Many Advantages Because feed volume on traveling grate is constant, kiln operation is uniform and more efficient. There is no segregation of mix. Pelletizing locks in and maintains proportions of components. "Flushing" is eliminated, "ringing" minimized. Voids between pellets permit escape of moisture and gases without fluidization of bed. Because clinker maintains pelletized characteristics, it moves through the rotary kiln uniformly and burns easily.

EFFECTIVE DUST FILTRATION . . . efficient heat transfer . . . more uniform, better burning clinker . . . substantial savings in fuel, power requirements, space and manpower . . . maintenance economy—all these im-

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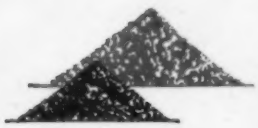
of Producing Cement

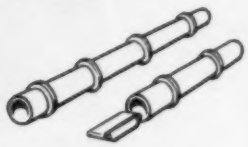


LESS FUEL

Fuel consumption for ACL systems now in operation averages 600,000 Btu per barrel of clinker. Conventional long, dry-process kilns range from 750,000 to 1,000,000 Btu. Powdered coal, fuel oil, natural or coke oven gas may be used.

LESS POWER

The ACL system for burning cement clinker requires about 2.3 kwhr per barrel of clinker for operation of kiln department. This is about one-third less power than required by rotary kilns using other preheating systems.



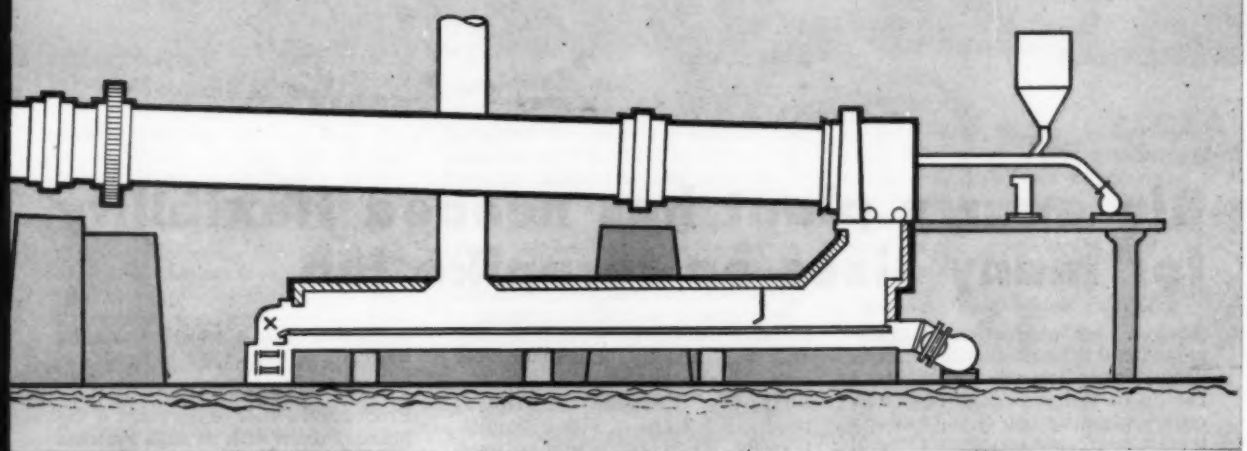
LESS SPACE

Entire ACL system—grate, kiln and cooler — is about 40% shorter than conventional long kiln installations. The totally enclosed traveling grate is about as high as the average kiln feed end housing.

How the Double-Pass System Works

Partial calcining and dust reclamation take place as hottest gases pass through the pellet bed on traveling grate. Gas temperatures are reduced from about 1800 to 500 degrees in this first pass (*A* to *B*). Next, gases pass through cyclones where larger dust particles are removed, and carried back to pelletizer. Final dust filtering takes place as gases pass through moist pellets on feed end of grate. In the second pass (*C* to *D*) gas temperatures are further reduced.

ACL is an Allis-Chalmers trademark.



portant advantages, and many more, are yours with the ACL system.

New Bulletin Available A new bulletin, describing the ACL system, Allis-Chalmers kilns and kiln auxiliaries, is ready for distribution. To get your copy, see your nearby Allis-Chalmers representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. Ask for Bulletin 07B8431.

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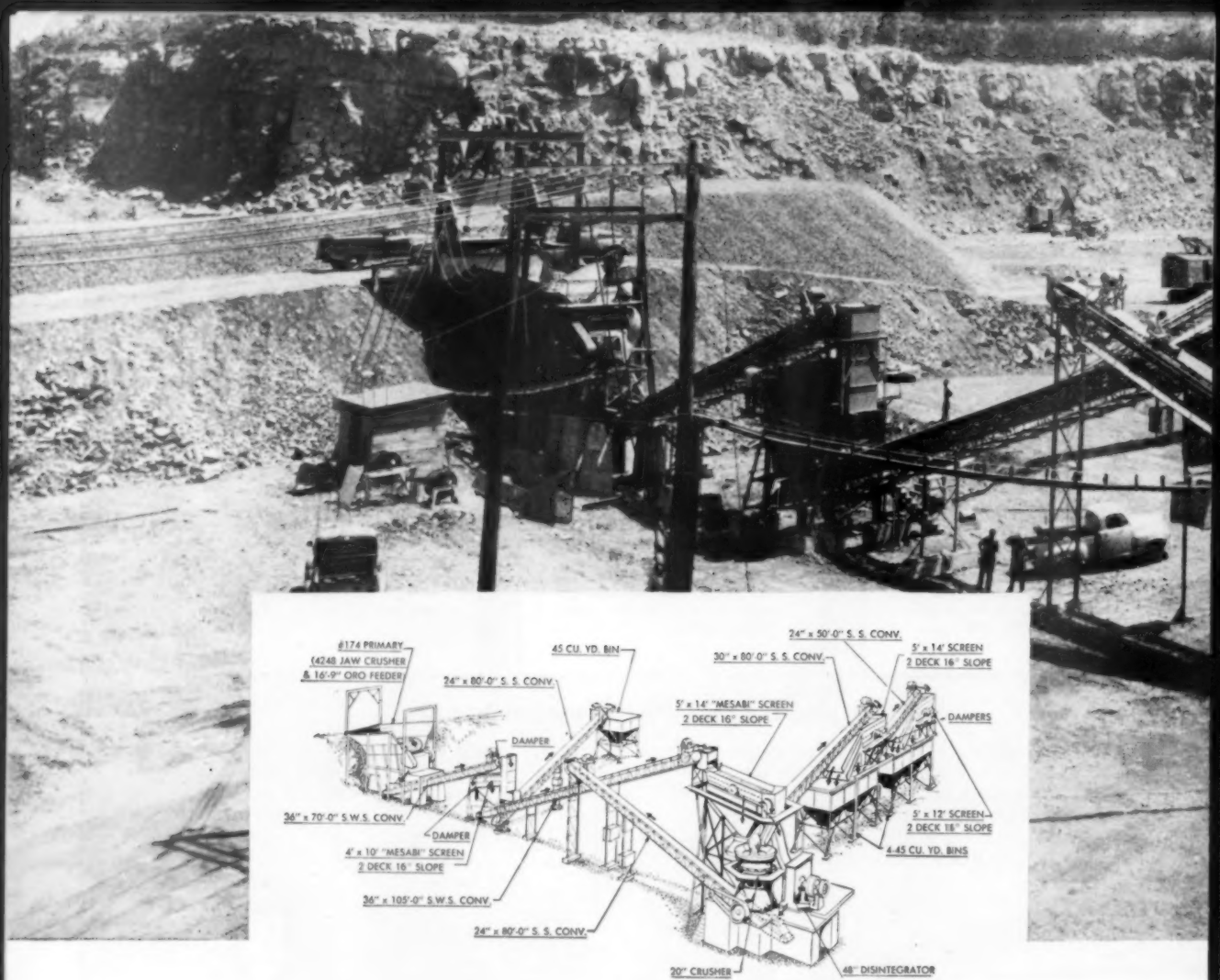


Big quarry plant has needed flexibility for many sizes on turnpike job

Assured high production of aggregates for the North-South Pennsylvania Turnpike was the deciding factor in the purchase of a new quarry plant by one of the nation's largest quarrying concerns. General Crushed Stone Company of Easton, Pennsylvania, was operating a 30-year old plant in their quarry near White Haven, Pennsylvania. Although this plant was operating satisfactorily, it could not begin to fill the demand generated by the new turnpike market along with other increased construction demands in the area. It was decided to erect a new plant on the quarry floor a few hundred yards from the older one.

Advantages of new installation

This new plant, engineered by Pioneer Engineering Works, Inc., was installed during the summer of 1954. It has a capacity of 250 tons per hour which more than doubles the output of the quarry. And it produces 5 sizes of stone simultaneously. When both plants are operating, more than 4500 tons of specification aggregates can be produced each 10 hour day. Besides doubling output, the new plant materially increased the over-all efficiency of the quarry operations . . . mainly by introducing more flexibility. For example, each plant complements the other by readily permitting *production of a complete range of stone sizes.* The new plant takes care of the entire output of crusher-run stone, as well as a few basic sizes which do not require washing; the older plant turns out washed material and other aggregates ranging from No. 4 stone down to sand.

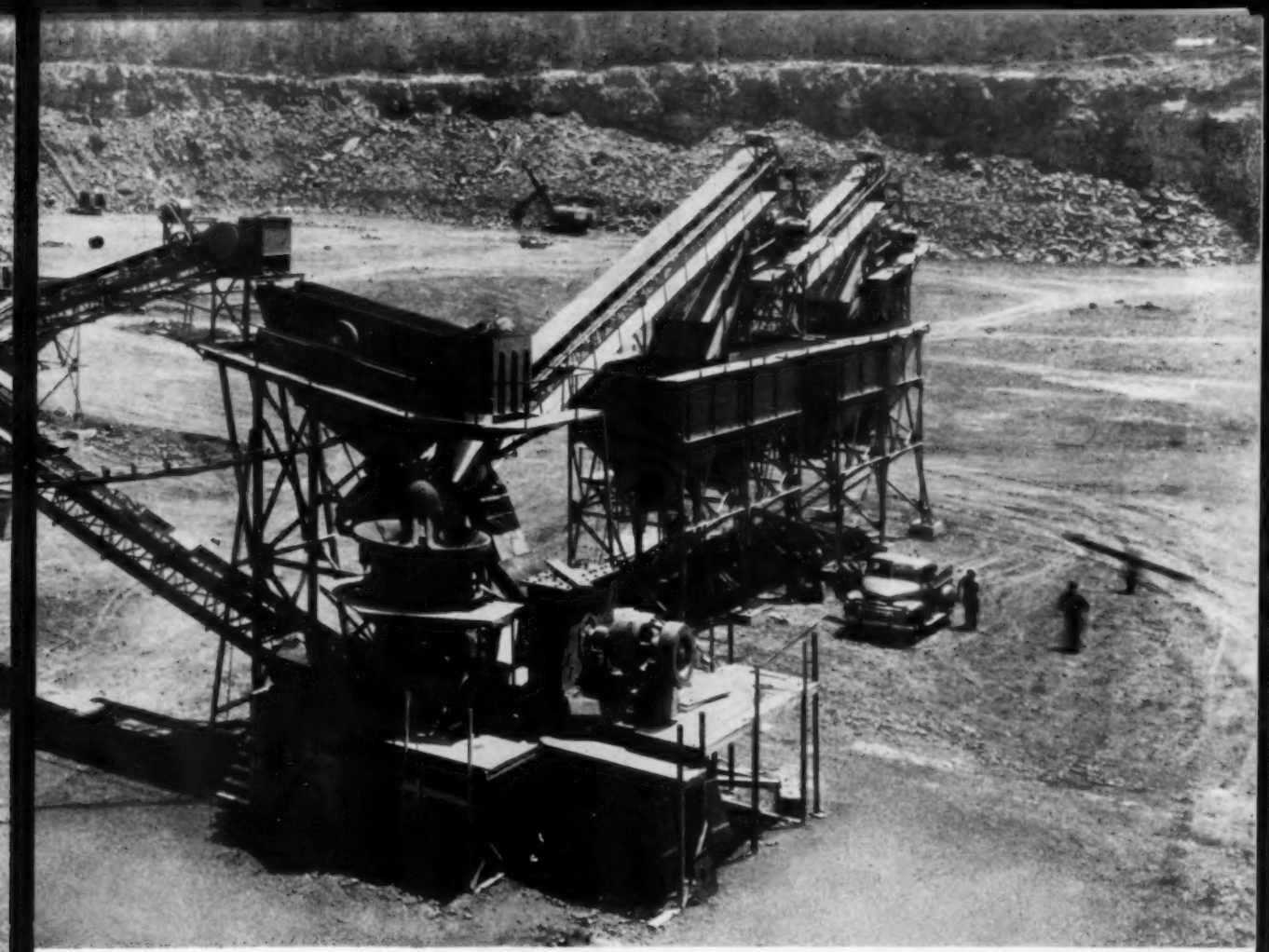
World's largest jaw crusher

Production center of the plant is the primary plant with its 4248 PIONEER overhead eccentric jaw crusher fed by a PIONEER-ORO feeder.

The jaw crusher has a 4 cubic yard crushing chamber. It features a number of PIONEER first developments such as self-aligning roller bearings . . . hydraulic adjusting mechanism . . . horizontally split base for easier handling . . . double wall box type base construction . . . reversible manganese steel jaw plates . . . and bearings which can be hydraulically expanded for easy removal.

Regulated feed boosts output

Regulated feeding is a "must" in an



efficient crushing plant such as the one at White Haven. Use of the PIONEER-ORO apron feeder in the primary crushing unit gives General Crushed Stone these 4 advantages:

(1) Even, continuous flow of material to the jaw crusher increases output by ending alternate choking and starving.

(2) Labor costs are lowered as only one man is required to control feeding.

(3) Actual running time increases, as stops for dislodging choked or bridged material in crusher are greatly reduced.

(4) Profits increase as steady, continuous input results in greater over-all plant efficiency, and greater output.

Construction features which contribute to long feeder life are important to General Crushed Stone. For example, parts of the PIONEER-ORO feeder such as pans, sprockets, and rollers are made of a high grade wear-resisting alloyed manganese cast steel. This remarkable steel actually fights back against wear. The more it's exposed to impact and abrasion, the harder and tougher it gets!

Other units increase flexibility

Four heavy duty double-deck screens for sizing the stone are used in the installation. The first is a 4′ x 10′ PIONEER Mesabi screen with 2½″ and 1″ openings. From it, crusher-run stone can be discharged to a lateral belt conveyor and transferred to a PIONEER 45 cu. yd. bin. When desirable, this screen can be entirely by-passed by a damper arrangement.

Oversize from the first screen can be conveyed by belt to a secondary Mesabi screen which produces 5″ minus and 3¾″ minus material. These products are then conveyed to two PIONEER finish screens mounted in series over four 45 cubic yard bins. Oversize from the top deck of the secondary screen is chuted back to an intermediate crusher, while bottom deck rejects are fed to a cage mill. Both crushers are operated in closed circuit with their products being fed back to the main delivery belt of the secondary Mesabi screen.

Five additional stone sizes obtained on finish screens

The first PIONEER finish screen, size 5′ x 14′ yields three stone sizes 3¾″ to 2½″, 2½″ to 1¼″ and minus 1¼″. The latter size is transferred to the second PIONEER finish screen, size 5′ x 12′, which is fitted with wire cloth having ½″ and No. 4½ mesh openings and produces 1½″ and ½″ materials and screenings.

Dampers give added flexibility

The first screen is fitted with a damper which enables rejects from each deck to be chuted to the same bin. The second is also equipped with a damper which permits discharge of all plus No. 4½ mesh stone to the same bin.

For more information on PIONEER crushing and screening equipment, write Pioneer Engineering Works, Inc., Minneapolis, Minnesota (subsidiary of Poor & Co., Chicago) or see nearest PIONEER Distributor.

Pioneer
Continuflo **EQUIPMENT**

REACTOR ON

New Industrial Era Dawns With Nuclear Application

By BUREN C. HEROD

Another ON THE SPOT Report

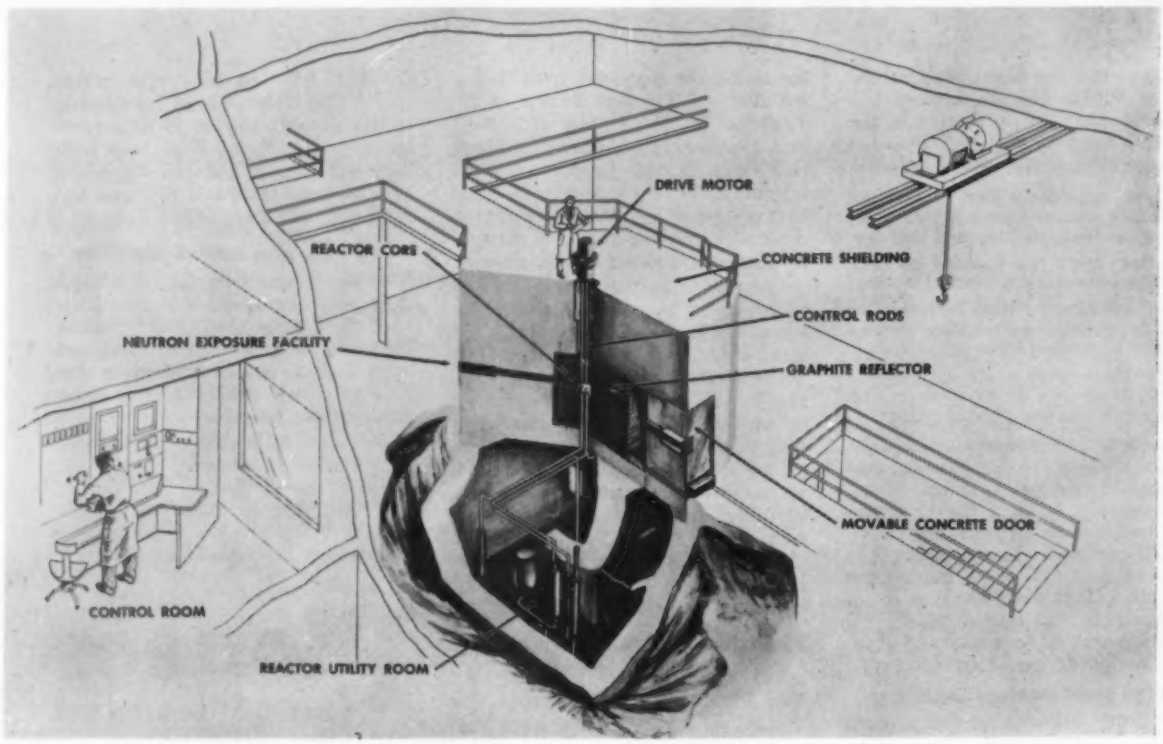
IN the 14 years since man first split the atom in a controlled, self-sustained chain reaction pile, the news of peaceful applications of a power which is variously regarded as either "terrible" or "wonderful" has been long awaited by frequently apprehensive, uninformed laymen — a category which probably includes the majority of the free world's population. That news has come concurrently with the beginning of a new era that dawned when the country's first privately owned nuclear reactor went into operation for industrial research on June 28.

Located in Armour Research Foundation's new physics and electrical engineering building on the south side of Chicago—only about three miles from the birthplace of the atomic age at Stagg Field—the reactor was built for Armour Research Foundation by Atomics International, a division of North American Aviation Inc., Canoga Park, Calif. As this is the first such installation since Fermi's original reactor in 1941 to be established in a populous area, people are now, literally, living peacefully with the power of atom.

Designed specifically for industrial research, the new reactor opens the door to unlimited non-military applications of nuclear energy and will allow reactor studies free of security restrictions and military competition. While the public has been informed in recent months of the pending application of atomic energy to the power field, this reactor, as explained by Dr. Richard F. Humphreys* of the Armour staff, is not intended for the generation of electrical power nor for research on reactors themselves, but is fundamentally a supply "tool" providing a source of fast and slow neutrons and gamma-rays.

Dr. Humphreys has stated that "the intent of the Armour facility

*Assistant director, Armour Research Foundation, and A.R.F.'s reactor program director.



An artist's perspective of private industry's first nuclear research reactor.

is to exploit the radiation received from a nuclear reactor, and the techniques associated with such radiation, in the solution of the many industrial problems which we face daily." Pointing out that "almost every element known can be made radioactive by subjection to bombardment by neutrons", he has indicated that probably the most frequent use of the A.R.F. research reactor will be in the production of radioactive samples.

As a research tool producing radioisotopes, neutron activation and diffraction, and radiation effects, the reactor makes possible studies in many industrial areas. Among these are the detection of microscopic fractures in concrete of various compositions, the study of alkali and sulphate reaction in cement, determination of gear wear under lubrication, the metallurgic mechanism involved in surface treatment of metals, and the study of transfer of materials in turbulent air streams. In addition, future possibilities include obtaining structure analyses of such items as heavy machine parts and castings, potentially more powerful than the standard X-ray diffraction techniques.

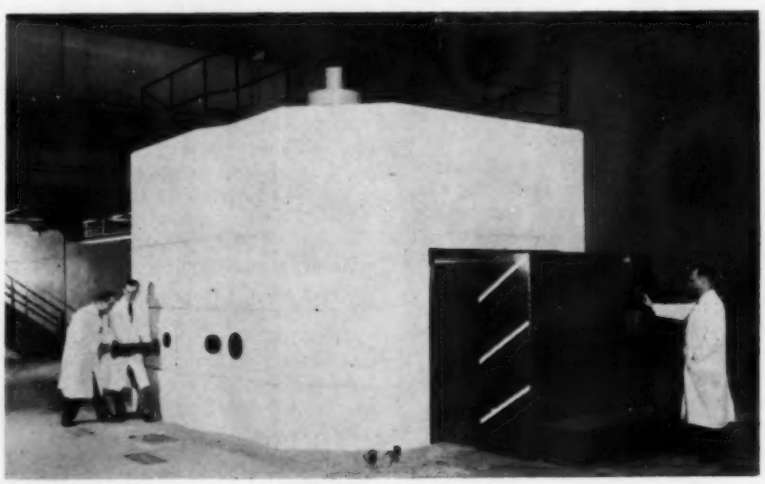
Illustrative of potential applications of nuclear techniques in the areas of materials handling and processing flow are the Norwegian studies carried out on wet slurry transport in rotary kilns.** In these studies radioisotopes of sodium and manganese added to kiln feed slurry under controlled conditions, made available valuable operating data relative to time of material passage through different kilns; rate of charge of material into various sections of the kilns, which also revealed retention time in each segment; and the mixing action which takes place.

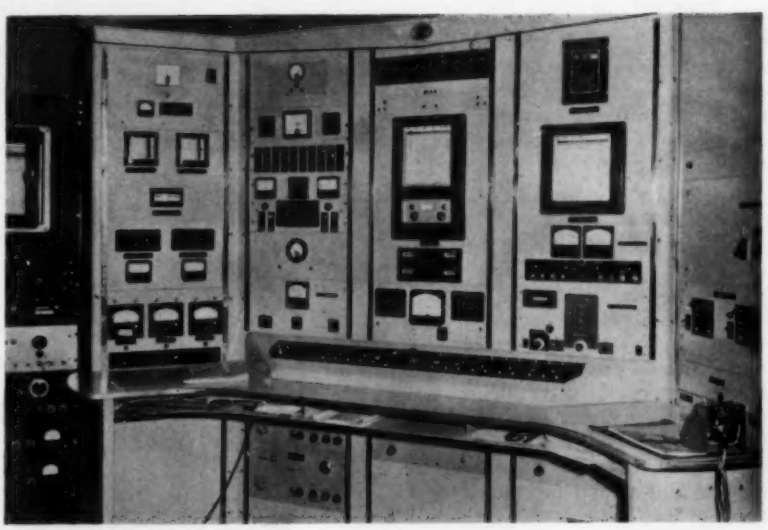
It has also been established in another foreign study that radioactive isotopes in conjunction with a geiger counter can be used to control the filling of closed containers such as silos. Isotopes emitting gamma-rays are, for example, capable of furnishing radiation that will penetrate 7/8-in. steel plate. With intensity of radiation measured by the geiger counter as a regulatory factor, the counter as a part of a controlling circuit can govern the feed mechanism. These few steps are already regarded in many industrial circles as having opened a wide vista of potential applications.

**See PIT AND QUARRY, July, 1955, pp. 120.

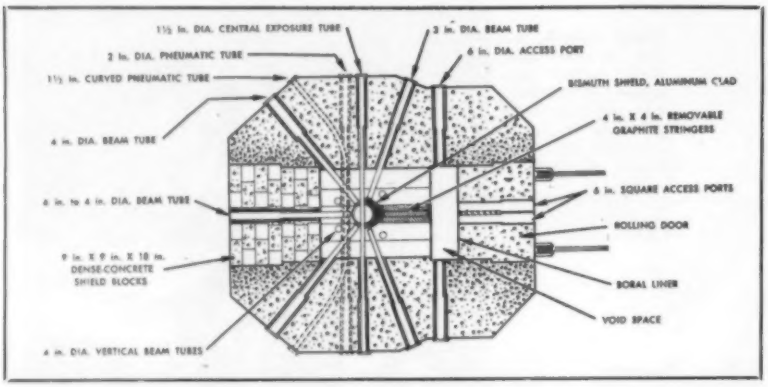
Right: Atomic fission, or atom "splitting", which produces radioactivity and nutrons, takes place in this stainless steel core—the heart of the reactor.

Below: Operating personnel at the left are checking a shielding plug for an exposure tube, while the scientist at the right is operating the controls for the reactor's 40,000-lb. concrete rolling door.





From this console in the control room, reactor operation is regulated.


1½ in. DIA. CENTRAL EXPOSURE TUBE
3 in. DIA. BEAM TUBE
2 in. DIA. PNEUMATIC TUBE
6 in. DIA. ACCESS PORT
1½ in. CURVED PNEUMATIC TUBE
BISMUTH SHIELD, ALUMINUM CLAD
4 in. DIA. BEAM TUBE
4 in. X 4 in. REMOVABLE GRAPHITE STRINGERS
6 in. SQUARE ACCESS PORTS
3 in. to 4 in. DIA. BEAM TUBE
ROLLING DOOR
9 in. X 9 in. X 18 in. DENSE-CONCRETE SHIELD BLOCKS
BORAL LINER
VOID SPACE
4 in. DIA. VERTICAL BEAM TUBES

A plan view showing beam tubes extending outward from the reactor's core through the dense-concrete biological shield.

In order to construct the reactor as a component of, and adjacent to other research facilities which are situated in a densely populated area, the unit was designed and built as what is known as a "contained" facility — one that has three independent barriers to the escape of radioactive gases, which represent practically the only potential hazard in a small reactor. (A bomb-like explosion is impossible.)

Basically, the reactor consists of the following: a core assembly; gas-handling, fuel-handling, and cooling systems; a control and safety rod system; a reflector assembly; and the necessary instrumentation and shielding for efficient and safe operation. Exposure facilities are provided through which neutrons and gamma-rays are available in various intensities for experimental procedures.

As a solution-type or "water boiler" reactor, the unit uses for "fuel" a solution of enriched uranium consisting of about one kilogram of uranyl sulphate (UO_2SO_4) dissolved in approximately 4 gal. of light water. This fuel is transferred from a lead-shielded fill-and-storage tank in a gas-tight subpile room below the reactor into the heart of the operation—the reactor core.

The core, an impressive assembly of stainless steel forms, is comprised of a spherical tank about 1 ft. in diameter containing four control rod thimbles that project vertically into the tank; a central exposure tube extending horizontally through the center of the tank; ten sections of tubing connected in parallel within the tank as cooling coils; a line for filling and draining fuel solution; and a gas outlet tube leading to the gas-handling system and the solution overflow tank.

With the water of solution acting as the moderator for the uranyl sulphate, the intensity of fission reaction resulting from introduction of operating critical mass is controlled by the positioning of four boron carbide cylinders in the core tank's control rod thimbles. For normal start-up of the reactor, one of the four control rods, each of which controls approximately 2 percent reactivity, is completely withdrawn from the core to serve as a safety rod; and the reactor is then brought up to operating power by remotely controlled vertical withdrawal of the other rods to the required height. Overall rod travel is about 12 in., and the rate of withdawal is about 0.1 in./second. Since the rods absorb neutrons, the rate of fission increases with rod withdrawal.

The rod drive mechanism (rack and pinion) and the rods, which are encased in stainless steel, are separate parts held together by electromagnets. The magnets are de-energized automatically by any of the reactor scram (safety) circuits or by power failure, and may be de-energized manually at the reactor's control console.

A variety of experimental facilities on the reactor provide access to the nuclear activity of the reactor core. These include horizontal and vertical beam tubes, 3 and 4 in. in diameter; pneumatic tubes; and a thermal column. Materials placed in these are exposed to neutron bombardment. The tube facilities consist of steel sleeves extending through the concrete shield and aluminum thimbles that reach to the immediate vicinity of the core. Each tube is equipped with a graphite reflector plug, and a dense-concrete and steel shielding plug that is installed when a tube is not in use.

The horizontal thermal column is formed by a 5-ft. square column of graphite, and a large volume has been provided for exposures between the end of the column and the inner face of a movable concrete door. Thermal column access ports open into this volume. In order to take advantage of gamma activity produced by fission product gases circulating through a gas recombiner tank located in the subpile room, steel sleeves and aluminum thimbles were installed extending through the dense concrete walls of the subpile area into the exposure room.

The gases created in the fission

(*Continued on page* 87)

A scientist operating mechanical arms whose "hands" handle materials in the exposure room of the "hot" laboratory.

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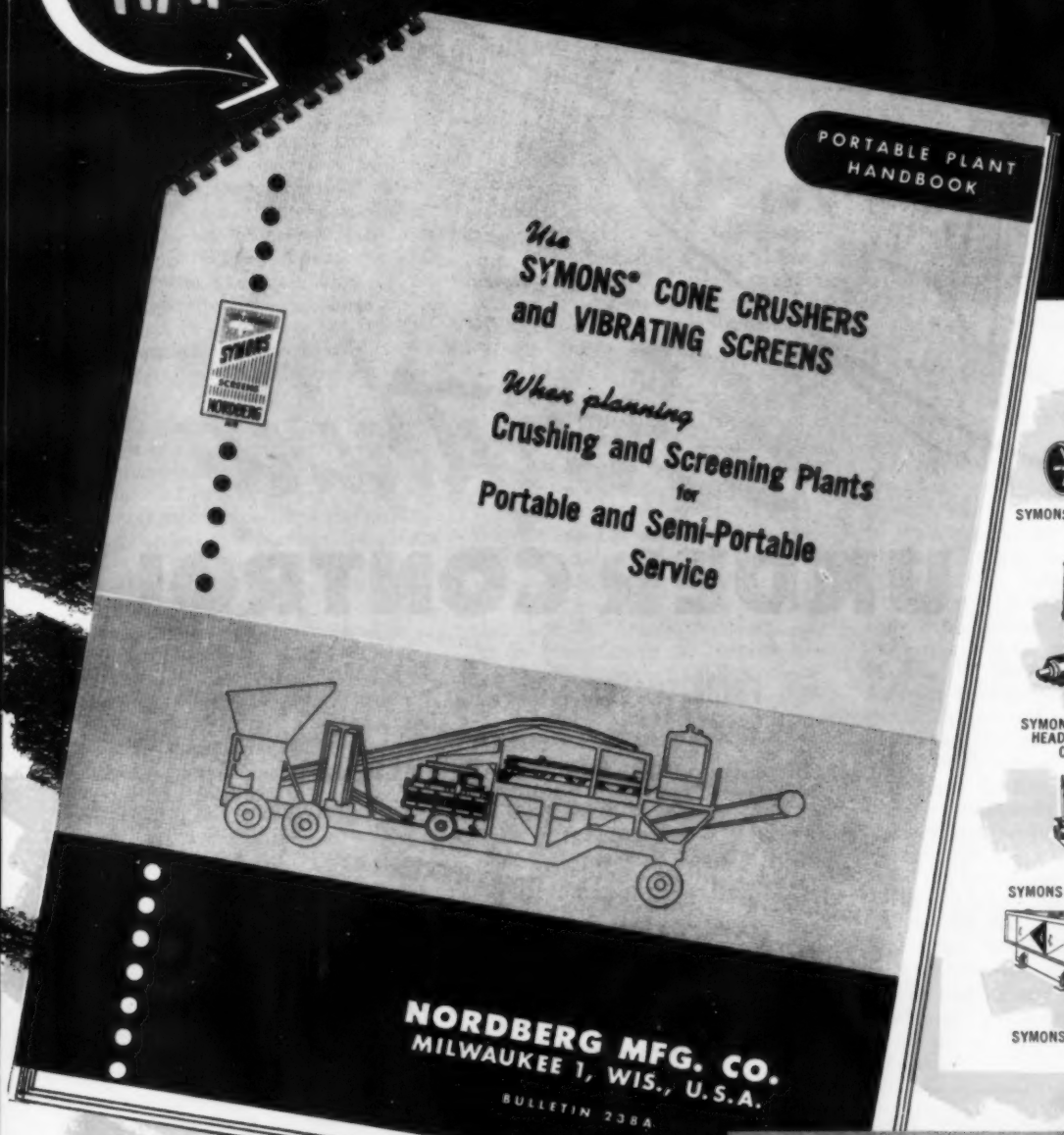
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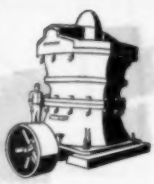
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Reactor On

(*From page* 84)

process consist of water vapor, gaseous fission products, and hydrogen and oxygen produced through the radiolysis of solution water. The gas-handling system referred to above has the function of recombining the hydrogen and oxygen and returning the resulting water to the core tank, and also of confining the radioactive fission-product gases while providing for their disposal.

Efficiency of reactor operation is increased by means of a reflector assembly which consists of a stack of graphite blocks completely surrounding the reactor core and reflecting neutrons back into it. A 5-ft. thick biological shield of dense hematite-colemanite concrete surrounds the entire reactor structure. This reduces the radiation level at all points exterior to the shield to a value which is less than one-tenth of the generally accepted safe dosage rate specified for laboratories handling radioactivity.

In addition to the above shielding, the three containment features of the reactor — the independent barriers mentioned previously—insure an extremely safe operation of the facility. The barriers to the release of fission gases include the completely closed stainless steel plumbing system, the metallic envelope that completely surrounds the reactor core and companion plumbing, and the reactor room itself. The latter is equipped with specially designed air-lock doors, has special paint on the walls, and an air-handling system that can be sealed off from the outside. Air pressure in the reactor room is also maintained at a slightly negative value to insure that any leakages would be inward.

All significant reactor temperatures are maintained at desired values by a cooling system which is comprised of a primary coolant pump, main and recombiner heat exchangers, core cooling coils, plus required valves and piping. Heat energy generated by atomic fission within the core and that released in the processing of gaseous products in the recombiner of the gas-handling system is removed by the primary coolant—distilled water. This heat energy is then transferred to the secondary coolant, ordinary city water, in the main heat exchanger. Since the secondary coolant line is isolated from the primary coolant water, radioactivity in the latter is not transferred. However, continuous monitoring of the system provides that in the event of a malfunction it will be automatically closed off from discharge into city water and sewage lines.

As might be expected, instrumentation of the reactor is quite comprehensive. The system consists principally of circuits which monitor reactor power, and also the performance of the gas-handling and cooling systems. To record or indicate temperature, pressure, and flow in these systems, instruments are provided for measurement of core and catalyst bed temperatures, sweep-gas flow and temperature, recombiner gas pressure, hydrogen concentration, and surge tank level.

In the event of a malfunction anywhere in the installation, an automatic shutdown is accomplished through circuits which de-energize the magnets holding the control and safety rods, thus allowing them to fall by gravity into the core. When such a shutdown occurs, instruments on the control console indicate the location and type of malfunction.

The three-man crew involved with the initial operation of the reactor will be augmented by a staff of nuclear scientists, health physicists, electronics specialists, and others.

General construction of the $700,000 facility was started by the general contractor, Paschen Contractors, Inc., of Chicago, on June 13 of last year. The reactor was designed and built by Atomic International. At the invitation of the Armour Research Foundation, 24 industrial organizations were invited to participate in the foundation's reactor research program in order to tie down as specifically as possible, during the next several years, the role which this new equipment and its techniques may serve in industrial applications and the solution of industry problems.

With A.R.F. supplying the balance of the funds, each of the following companies contributed $20,000 toward the construction and initial operation of the reactor installation:

Armour & Company, Chicago

Aro Equipment Corporation, Bryan, Ohio

Ball Brothers Company, Inc., Muncie, Ind.

Borg-Warner Corporation, Bellwood, Ill.

Caterpillar Tractor Company, Peoria, Ill.

Clark Equipment Company, Buchanan, Mich.

Dewey and Almy Chemical Company, Cambridge, Mass.

Elgin National Watch Company, Elgin, Ill.

Eli Lilly and Company, Indianapolis, Ind.

The Firestone Tire and Rubber Company, Akron, Ohio

General Portland Cement Company, Chicago

Gustin-Bacon Manufacturing Company, Kansas City, Mo.

Illinois Tool Works, Chicago

Inland Steel Company, East Chicago, Ind.

International Business Machines Corporation, New York

M. W. Kellogg Company, New York

Kimberly-Clark Corporation, Neenah, Wis.

Nuclear Instruments and Chemical Corporation, Chicago

Ohmite Manufacturing Company, Chicago

The Richardson Company, Melrose Park, Ill.

United States Steel Corporation, Pittsburgh, Pa.

Universal Oil Products Company, Des Plaines, Ill.

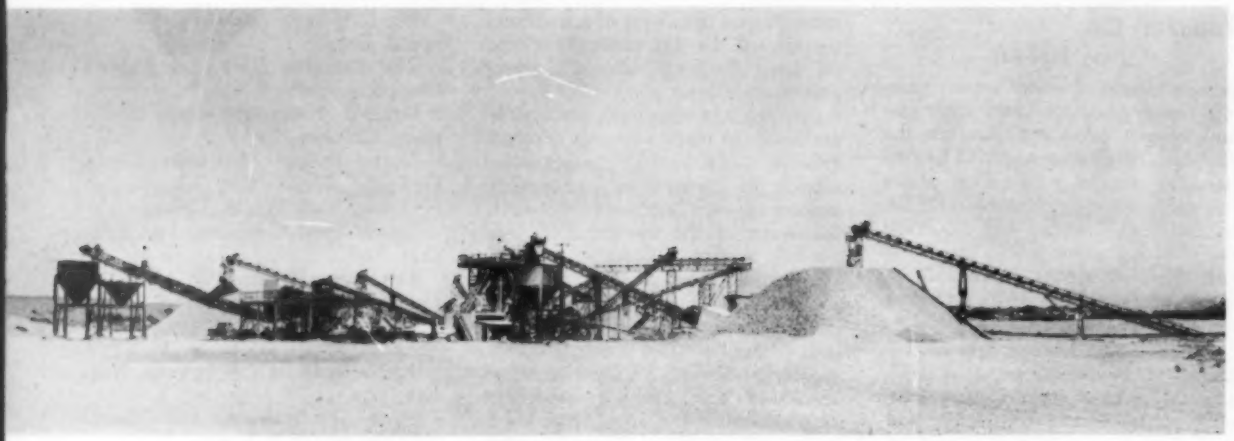
Victor Chemical Company, Chicago

Whirlpool-Seeger Corporation, St. Joseph, Mich.

In addition to sharing in the benefits of an extensive three-year program of study on atomic applications to industry, the participating companies will receive detailed technical advice, certain patent benefits, and a degree of specialized training of company personnel.

At 11:15 a.m. on June 28, Dr. Marlin E. Remley, representing Atomics International, seated himself at the control console before a silent, watchful group of spectators. In the other side of a thick double-plate glass window, the reactor was visible—and equally silent. The quiet was abruptly broken as Dr. Remley manipulated the first controls. Behind double air-locked doors an alarm bell began ringing, and a signal flashed REACTOR ON — no mushroom cloud, no horrendous blast of heat and shock waves, but a quiet clicking and crackling of the monitoring instruments as work-a-day uses of atomic power were initiated.

The Manchester Sand, Gravel and Cement Company, Inc., Manchester N. H., has been awarded a contract for the construction of a 2.01-mile section of the Central Turnpike. The firm's bid was for $1,753,070.85. This project involves the movement of about 1,000,000 cu. yds. of earth in addition to the construction of overpasses, the highway section, and a security fence.



An overall view of the Southern Pacific Milling Company's Sisquoc operation near Santa Maria, Calif. The sink-and-float product bins (left) are fed by conveyors from the heavy-media-separation plant. At the right the conveyor from the primary crusher builds the 4,000-ton capacity surge pile.

So. Pacific Milling's H.M.S. Plant

First Gravel Operation in West To Use Sink-Float Method

By HARRY F. UTLEY

Another ON THE SPOT Report

LAST year an exclusive article in PIT AND QUARRY[1] told an amazing story of transition whereby the 70-year-old Southern Pacific Milling Company had divested itself of its long-time agricultural-warehousing activities to become exclusively a producer of aggregates and ready-mixed concrete, with a chain of a dozen or more plants.

This year S. P. Milling is again making industry news with the start of operations at its new Sisquoc sand-and gravel plant, which employs heavy-media separation to upgrade its concrete-aggregates output. The Sisquoc operations, reportedly the first to utilize the sink-float method of beneficiating gravel in the western half of the United States, got into active production in July, 1956.

Located on the river of the same name about 15 miles southeast of Santa Maria, Calif., the plant is in the heart of California's central coast area, where all known sand-and gravel deposits contain varying pr

portions of softer shales, which are undesirable in specification aggregates and difficult to remove by mechanical means. When highest quality material was specified in the past, it was almost always necessary to transport these aggregates from distant sources, often 100 miles or more, and at high cost. S.P. Milling decided to do away with this nonsense by investing in heavy-media-separation equipment to float out the undesirable shales, since basically the Sisquoc gravel was perfectly sound and of good quality.

Gravels beneficiated by the H.M.S. process at Sisquoc are in the large and medium-size ranges, either minus 1½-plus ¾-in., or a minus ¾-plus ½-in. product. These are first sized, scrubbed, washed, and dewatered in the regular processing plant before going by conveyor to the H.M.S. plant.

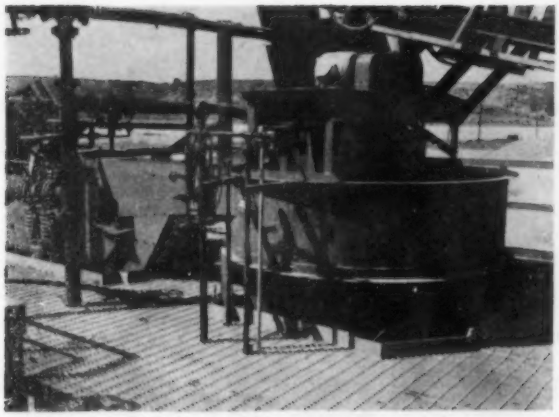
Western Machinery Company, San Francisco, supplied and installed the heavy-media department. This concern has more or less standardized this equipment for the mining and processing industries in what is known as its Wemco Mobil-Mill. The No. 3 Mobil-Mill installed at Sisquoc is similar in most respects to those installed in recent years by the Owatonna Aggregates Corporation in Minnesota[2] to beneficiate gravel and on the Pacific Coast at the Kaiser Aluminum & Chemical Corporation's plant at Natividad, Calif.[3] where dolomite is up-graded before dead-burning and calcining. Both installations were, incidentally, inspected by S. P. Milling officials before the Sisquoc plant was ordered.

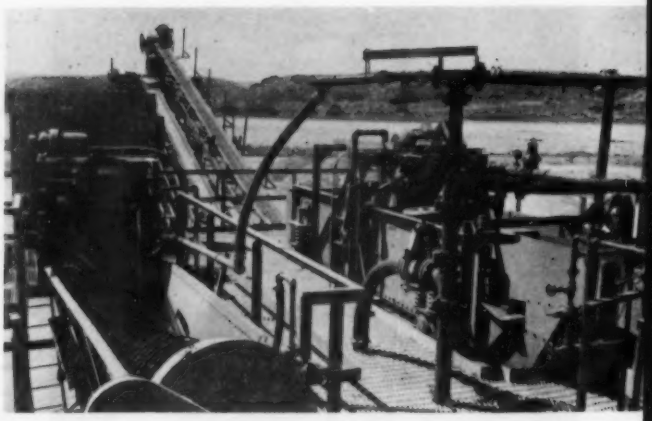
Conveyed a short distance to the Mobil-Mill, the gravel is fed directly into a 7-ft. diameter cone-type separatory vessel containing the heavy media, which has a specific gravity of 2.4 The high-grade natural and crushed gravel (sp. gr. about 2.6) sinks to the bottom of the cone in this heavy liquid, while the lighter shale (sp. gr. about 2.0) will, of course, float. The liquid, or heavy

[1] PIT AND QUARRY, January, 1955, p. 152.

[2] PIT AND QUARRY, October, 1953, p. 87.

[3] PIT AND QUARRY, November, 1952 p. 94.





Above, left: The upper portion of the 7-ft. cone separator in the heavy-media plant.

Above, right: This view of the H.M.S. plant shows the magnetic separator and the densifier screw for media at the left; the screen is at the right.

Right: The H.M.S. plant as it appears from the top of the screening-and-crushing tower.

media, is created by thoroughly mixing about 75 percent of finely-ground magnetite and 25 percent of ferrosilicon (received in drums and paper bags) with water, in a proportion to obtain a suspended media sp. gr. of 2.40. This is controlled within close limits by the operator, who checks it at least once every 30 min. The desired product is raised by air-lift to a launder at the top of the cone, while the shale float overflows to a weir and another launder, both the sink and float fractions passing to a longitudinally-divided screen.

Data on the efficiency of the system may be summarized in a nutshell in the following table based on tests conducted by the California Division of Highways on the feed to the plant and the resultant sink and float products:

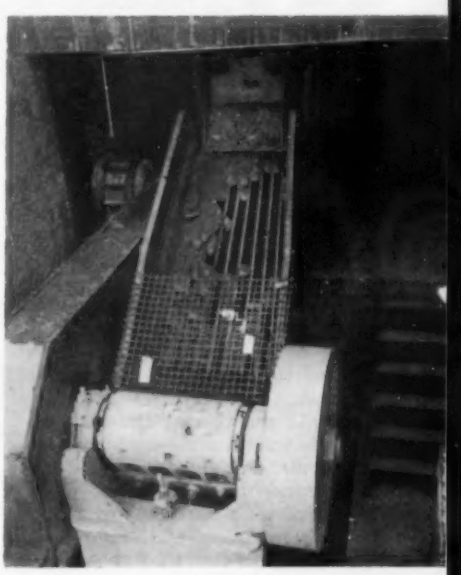
At Media Sp. Gr. 2.40

	Feed	Sink	Float
% by weight	100	85	15
Specific Gravity	2.52	2.61	2.08
Absorb.	3.0	1.6	13.2
% Shale	17.2	4.5	91.0
% Loss in Soundness Test ($NaSO_4$)	7.5	3.2	31.5

The 4- by 16-ft. Allis-Chalmers single-deck screen has, as noted, a steel-plate divider running the full length of the deck to form a 1-ft. wide channel to handle the shale float and 3 ft. of its width for the up-graded gravel, or sink product. It is equipped with stainless-steel slotted mesh spaced at 1/16 in., the sole purpose of the screen being to recover and pass the media adhering to the particles. Separate belt conveyors carry the clean sink and float products to two truck-loading bins, one of 12-ton capacity to contain the waste shale, the other a 30-ton unit for the specification gravels.

Most of the media readily drains off the upper portion of the screen and, being undiluted, drops into a collecting sump immediately below and is pumped directly back up to the cone separator. Beyond the area over the sump the screen is fitted with water sprays, which wash off the remaining vestige of any media. This dilute portion passes for thickening to a Dings magnetic separator, a Wemco screw densifier, and a demagnetizing coil before the dewatered media returns to the primary circuit at the desired specific gravity. Preliminary estimates indicate that media loss during operations is remarkably low, about .4 lb. per ton of feed. During the first month of operation the plant ran intermittently at an average feed rate of 65 t.p.h. It is believed that beneficiation can be stepped up, however, by at least 50 percent from that figure.

Since most of the interest in the Sisquoc operations seems to be in the heavy-media-separation department, this descriptive article has been cart-before-the-horse insofar as flow sequence of the entire plant is concerned. The new 250-t.p.h. aggregates plant proper is, however, completely modern and highly efficient in every respect. It replaces an old plant which had been in service, although progressively improved, ever since S. P. Milling acquired the Sisquoc deposits and production facilities nearly a decade ago. It was designed and its component parts



The feeder and grizzly ahead of the 15- by 38-in. jaw primary crusher.

The roll crusher and the cone crusher are mounted side by side below the two main screens.

Looking down on the 60-in. sand classifier; above, at the right, are the high- and low-pressure pumps which handle the auxiliary water supply from the reservoir.

fabricated by Cook Bros. Equipment Co., Los Angeles, and erected by Mittry Constructors, also of Los Angeles. The Mittry firm, incidentally, has the general contract for the early construction of the Bureau of Reclamation's Vaquero Dam, near Santa Maria, for which the new Sisquoc plant will furnish 45,000 tons of specification concrete aggregates.

Excavation in the pit is done by a Link-Belt 1½-cu. yd. diesel dragline, and the pit-run material is delivered to the receiving hopper of the plant by two Cook Bros. semi-trailer bottom-dump diesel-powered units. Each can carry 32 tons. Loads are discharged over a 15-in. grizzly spanning the mouth of the 45-ton receiving hopper. A Pioneer 24G reciprocating feeder diverts the material to the 15- by 38-in. Wheeling primary jaw-crusher, passing the crusher feed over a sloping grizzly with bars spaced at 3 in. The throughs and the crusher product travel via a 24-in. by 165-ft. inclined belt conveyor to build a 4,000-ton capacity surge pile, 40 ft. high at the peak. Recovery from the primary pile and the finished-material piles is via a reinforced-concrete tunnel, the 24-in. by 145-ft. conveyor carrying the minus 3-in. plant feed running up to the top of a central screening-and-crushing structure. The 42- by 60-in. F55 Syntron feeder in the tunnel beneath the surge pile is controlled from this structure.

Scalping, sizing, and spray-washing of the natural and crushed gravels takes place on a pair of Symons 2½-deck heavy-duty screens mounted on the upper floor of the structure.

Material coming off the conveyor from the surge pile receives a preliminary cleansing in a soaking chamber before it rolls onto the 4- by 16-ft. natural-gravel screen. The top deck, carrying 1½- and ½-in. openings, rejects the retained oversize by spout to a 3-ft. Symons cone crusher. The middle deck has ⅜- and ¾-in. openings, while the lower half-deck consists of ¼-in. mesh to pass the sand to a 60-in. Wemco screw classifier (sand-preparation machine).

Cone-crusher product is carried up to the 4- by 14-ft. 2½-deck crushed-material screen, which has openings identical with the natural-gravel screen mentioned above, except that the bottom half-deck has 3/32-in. mesh where the throughs are wasted. Top-deck oversize passes to a Universal 40- by 24-in. roll-crusher carrying one smooth and one corrugated roll and spaced about ½ in.; the rolls are closed-circuited with the screen. Products of the crushed-gravel screen join the natural gravel from the first screen and are stockpiled by 18-in. stacker belts via rock ladders to build three separate piles. These are normally sized to conform to state highway specifications — minus 1½ plus ¾ in.; minus ¾ plus ½ in.; and minus ½ plus ¼ in. The pea gravel (minus ⅜ plus ¼ in.), however, is carried by another conveyor to separate bin storage. C. S. Johnson gates in the tunnel are remote-controlled.

The two larger sizes of gravel are subject to further scrubbing following the sizing and crushing operations, before they pass to storage or are sent to the H.M.S. plant. Two Eagle coarse-material screw-type washers aid in this final cleanup and eliminate some of the shale or occasional clay-balls before the finished products pass to storage over the tunnel or to H.M.S. The Eagle washers are preceded and followed by Pioneer 3- by 6-ft. single-deck "buzzer" screens, the first taking out any trash, which is conveyed to a reject bin, and those following the screw washers serving simply as dewaterers.

The entire screening-and-crushing circuit can be quickly converted to dry operation for the production of crusher-run-base material when so required. The intricate system of spouts and piping beneath the screens is equipped with diversion gates for flexibility, so that the prescribed general flow sequence can be altered at option, permitting the separation of crushed and uncrushed product, diverting any of the prod-

uct for further processing, or combining sizes in a different manner from usual practice.

The sand is carried by a 24-in. inclined conveyor to an elevated crossbelt which shuttles to build drainage piles above a separate sand-reclaiming tunnel.

From the tunnels beneath the piles, a 24-in. conveyor carries to the all-steel loading bins above a Webb 60-ft., 100,000-lb. truck scale. There are five of these bins arranged in line over the scale platform, the swivel spout being controlled from the adjoining scale-house. The scale operator also regulates the flow of material from the tunnel stockpiles to the truck-loading bins via an interlocked electronic control panel beside the scale beam. Bin gates are air-ram-operated by finger-tip control levers; these are also convenient to the scale beam. Bindicators at high level warn and automatically cut off the feed when the bins are full. At present each of the five bins can contain 45 tons of material, but extensions will soon be installed to increase storage capacity to 75 tons.

A Byron-Jackson deep-well pump supplies 650 to 700 g.p.m. of water but this is sufficient only to care for about half the needs of the plant (including the H.M.S. department) when operating at capacity. To augment the supply, a 120,000-gal. reservoir is filled by the pump during the night and drawn upon during the operating hours of the day. A high-pressure and a low-pressure pump take care of the auxiliary supply from the reservoir; and a cyclone sand extractor in the circuit keeps the lines clear.

Most of the conveyors are of Pioneer lattice-type construction, and carry Quaker-Pioneer "Reliance" belting.

Northern division headquarters are maintained in Santa Maria. Nicholas Savage is manager of this division, under which the new Sisquoc facility operates. Instant communication is maintained by radio from the Motorola KME 651 base transmitter in Santa Maria, and cars and trucks of key personnel and other rolling stock are equipped for 2-way contact with the Santa Maria office and with any of the other radio-equipped cars.

Gordon Tucker is the Santa Maria branch manager; Fred Williams is assistant branch manager; and Clarence Bolter is Sisquoc plant superintendent. Southern division and general headquarters are located at the Montalvo, Calif., plant. Philip Holmes is vice-president and general manager of the firm.

Left: Two coarse-gravel blends feed to the stockpiling conveyors after dewatering by the pair of "buzzer" screens which follow the coarse-material washers.

Below: The recovery conveyor, emerging from the tunnel transfer to feed the five truck-loading bins. The fine gravel stockpile is at the left; the sand at the right.

Medusa Portland Cement Issues Manual on Basements

Of interest to both the plant operator in the building industry and to the homeowner is a new 16-page booklet entitled *How to Make Dry Basements,* published by the Medusa Portland Cement Company.

This brochure discusses the causes of damp basements, lists 12 individual reasons why basements are damp, and tells how to correct them before applying any type of waterproofing material.

In the section on new homes, a diagrammatic sketch shows 11 key points where new homes need protection against moisture menace. In the section on existing homes procedures are given for drying basement by the applications of Medusa waterproofings. Inquiries should be addressed to the Medusa Portland Cement Company, 1000 Midland Bldg., Dept. 756, Cleveland 15, Ohio.

Dr. Frank A. Grant, a physicist, has joined the staff of the Mineral Products Division of the National Bureau of Standards, Washington, D. C. Dr. Grant will do research on the semiconducting properties of titanium dioxide and titanates.

59th A.S.T.M. Meeting Draws Crowd of 3100—

Schatzel Named President

Rudolph A. Schatzel, Rome Cable Corporation, Rome, N. Y., newly-elected president of A.S.T.M.

William Lerch, chairman of the committee on methods of testing for volume changes of concrete and concrete aggregates.

By C. E. PROUDLEY

Chief Materials Engineer
North Carolina State Highway and
Public Works Commission

Another ON THE SPOT Report

MORE members and visitors attended the 59th annual meeting of the American Society for Testing Materials in Atlantic City, N. J., during the week of June 17, 1956, than in any previous year. Whether this was because of the broader scope of interests resulting from the formation of new committees on such subjects as carbon black, sorbent materials, casein, and materials used in nuclear energy work, or because there has been a sharper upturn in the curve of interest in research, testing, quality control and specifications for all types of materials, the result was an amazing increase in attendance. This meeting's registration surpassed the highest previous record by at least 20 percent, for a total of 2,896, not including the 204 ladies who were registered and for whom the Philadelphia District Council provided excellent entertainment throughout the week.

Dr. A. Allan Bates, vice-president, research and development, P.C.A., presided over the general session.

The 12th Exhibit of Testing and Scientific Apparatus and Laboratory Supplies, and the 10th Photographic Exhibit and Competition on the theme materials, testing, and research were also strong drawing cards. But the real attraction, as always, was the work being persistently carried forward by the nearly 10,000 men serving without financial compensation from A.S.T.M. on the more than 700 technical committees.

Concrete Aggregates Committee C-9 on Concrete and Concrete Aggregates acted upon the tentative specifications for concrete aggregates (C 33-55T) in those paragraphs pertaining to materials which are deleteriously reactive with the alkali in portland cement, especially with regard to the Method of Test for Potential Alkali Reactivity of Cement-Aggregate Combinations (A.S.T.M. Designation: C 227). The test calls for the use of a high-alkali cement, which will be described as a cement having an alkali content of substantially above 0.6 percent and preferably above 0.8 percent, expressed as sodium oxide. A new paragraph was added to this section on tests for potential reactivity referring to Method of Test for Potential Volume Change of Cement-Aggregate Combinations (A.S.T.M. Designation: C 342). A critical expansion at the age of one year is indicated to be 0.200 percent when tested by this procedure.

In the tentative method of test for soundness of aggregates by the use of sodium sulphate (C 88-55T) a note is being added which may influence the interpretation of this test as applied to ledge rock: "Note—A piece of aggregate is defined as any

fragment which weighs at least 10 percent of the oven-dried weight of the fragment from which it is broken."

Subcommittee III-b on Methods of Testing for Volume Changes of Concrete and Concrete Aggregates—William Lerch of the Portland Cement Association, Chicago, chairman—distributed a report to members of Committee C-9 proposing a Dilatometer Method of Test for Thermal Coefficient of Expansion of Concrete Aggregates. Results of tests using the proposed method and comparisons of the values with those determined by other investigators using other methods accompanied the proposal as evidence on which to base the tentative acceptance of the test method. The scope of the dilatometer method states, "This method of test covers a procedure for determining the mean thermal coefficient of expansion of both fine and coarse aggregate in a water-saturated condition. Attention is called to the fact that this method does not differentiate the different directional coefficients of expansion possessed by some minerals and which may be, in some cases, a significant property of aggregates."

Much criticism has been made for many years of the inaccuracies of the Standard Method of Test for Organic Impurities in Sands for Concrete (C 40-48). This method is being revised to permit the use of two different means for securing the reference standard color. Instead of the customary tannic acid solution, reference is made to standard methods of testing varnishes (A.S.T.M. Designation: D 154-53) Table I, Section 6, "Gardner (1933) Color Standard No. 11." For those who favor the series of five color plates formerly reproduced in connection with method C 40, the Gardner Color Standards Numbers 5, 8, 11, 14 and 16 are to be freshly prepared from potassium dichromate in sulphuric acid. An alternate procedure permits, in lieu of the color solution, the use of permanent, transparent colored glass. The glass, mounted in a plastic holder, provides all five organic plate color numbers and is obtainable from Hellige, Incorporated, 877 Stewart Avenue, Garden City, N. Y.

An election of officers for Committee C-9 resulted in the re-election for the ensuing two years of the incumbents: Walter H. Price, head, Engineering Laboratories, U. S. Bureau of Reclamation, Denver, Colo., chairman; Fred Hubbard, consulting engineer, The Standard Slag Company, Youngstown, Ohio, vice-chairman; and Bryant Mather, engineer (concrete research), Concrete Division, Waterways Experiment Station, Jackson, Miss., secretary.

Research in Concrete A general session of the society on Monday evening was presided over by Dr. A. Allan Bates, vice-president of research and development, Portland Cement Association, Chicago. The first paper, authored by D. H. Sawyer and S. F. Lee, research engineer and resident engineer respectively, Kentucky Department of Highways, confirmed several of the ideas that have been cautiously proposed in recent years regarding the effects of delayed revibration of concrete. Mr. Sawyer summarized the data under the subject *The Effects of Revibration on Properties of Portland Cement Concrete.* The introduction to the paper points to the concept that has prevailed heretofore that concrete should not be disturbed after its initial placement and early vibration. There have been instances, nevertheless, in which, due to delayed delivery of concrete, the concrete has been successfully reworked and tamped to prevent a "cold joint." Mr. Sawyer recalled that during World War II the shipbuilding industry used a revibration technique in obtaining water-tight concrete in the construction of concrete tankers and dry docks. Reference was also made to the sixth edition of the Bureau of Reclamation's *Concrete Manual,* which states that "revibration has been found to be beneficial rather than detrimental, provided that the concrete is again brought to a plastic condition." It is also stated

Fred Hubbard, vice-chairman of the committee on concrete aggregates, who received the A.S.T.M. Award of Merit.

Kenneth B. Woods, Purdue University, who was named vice-president of the association.

John W. McBurney, National Bureau of Standards, who also was presented with the Award of Merit.

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They have "no-stop" power-shift transmissions and torque converters . . . planetary final drives . . . power-steering and 4-wheel power brakes.

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that "revibration may be accomplished by immersion-type vibrators, by form vibration, or by transmittal of vibration through the reinforcement system."

The Research Division of the Kentucky Department of Highways undertook a series of experiments to determine some of the effects of revibration such as compressive and flexural strengths and durability. Samples of concrete of a single, 6-bag mix design, with and without air entrainment, were revibrated after delays ranging from 45 minutes to 6 hours. Tests are in progress (but were not reported in this paper) on 4½-bag concrete with a retardant, revibrated up to 16 hours. The conclusions justified by the data reported were as follows:

1. Revibration will increase the strength of concrete after any period of delay, as long as the mix can be brought to a plastic state, even if the vibrator must be forced into the concrete.

2. The durability of non-air-entrained concrete is critically decreased, while the durability of air-entrained concrete is not significantly affected by vibration.

3. The possibility of overvibrating after any revibration delay does not appear critical.

4. Revibration at any feasible period of delay does not cause segregation.

5. The optimum time after casting to revibrate occurs when the vibrator will just sink into the concrete of its own accord."

Higher Flexural Strength and Better Uniformity A statistical study of flexural strength of concrete beams by William C. Otto, civil engineer (soils mechanics and paving), Bureau of Yards and Docks, Washington, D. C., was presented by L. A. Palmer, engineering consultant in soil mechanics and paving of the Bureau of Yards and Docks. The purpose of the study was to set reasonable limits for flexural strength of concrete pavement for military air fields. Reasonably high flexural strength is a necessity because inactivation of fields for repairs interrupts training schedules and also results in non-use of very costly aircraft. In Navy construction the trend has been to reduce slab thicknesses and to increase and render more uniform the beam strength in airfield pavements. The data were analyzed as individual tests and also as averages of groups of tests. The data indicated that the coefficient of variation tends to be no greater for tests in flexure than for tests in compression; also that there seems to be no reliable relationship between flexural and compressive strengths. Use of flexure tests for control has the additional advantage of using easily portable equipment in the field.

Although the report used no data beyond 28 days for the statistical analyses, it was observed that it seems to be a general condition that concrete pavement having good (600 to 800 p.s.i.) flexural strength at 28 days, tends (with certain exceptions) to increase more in flexural strength with time (up to 6 years as determined by beams sawed from slabs in the field), than the slabs having lower flexural strengths at 28 days. Among the conclusions based on the data presented in the paper were the following:

1. For uniformly high flexural strength in the field it would be well to specify two control limits—a minimum group average and a minimum value for any individual beam of a group.

2. The mean of the group averages for the projects described tended to be from 7 to 15 percent higher than the mean for the minimum values of all groups of a project.

3. It seems apparent that it should be advantageous for paving contractors and others to use cumulative frequency curves obtained with sufficient data in order to "set a target" for a mean group average flexural strength which if attained, will tend to minimize without undue cost the number of instances of failure to meet specification requirements with respect to acceptable limits for minimum group averages and minimum values for any individual beam of a group." It is suggested that the A.S.T.M. manual on Quality Control of Materials issued as a separate publication (A.S.T.M. —STP Number 15-C) be secured as an aid in the application of statistical methods to problems of construction.

An interesting description of *Automatic Equipment and Comparative Test Results for the Four A.S.T.M. Freezing and Thawing Methods for Concrete*, by H. T. Arni, B. E. Foster, and R. A. Clevenger of the National Bureau of Standards was ably presented by Mr. Arni. In recent years it appears that the improvement in automatic freezing and thawing equipment is directing the attention of testing and research engineers more and more to the value of this method of distinguishing between the desirable properties of concrete ingredients in spite of the relatively high cost of freezing and thawing equipment.

In a paper on the *Correlation of Sonic Properties of Concrete With Creep and Relaxation*, Tien S. Chang and Clyde E. Kesler, instructor and associate professor of theoretical and applied mechanics, respectively, University of Illinois, indicated a method of relating these properties through studies of 6- by 12-in. concrete cylinders. The investigation included five series of tests covering short-time (up to 3 days) creep in compression; long-time (up to 7 months) creep in compression; relaxation in compression; creep of uniformly loaded beams; and creep of beams with concentrated loads. Among other conclusions the authors stated that although the data available for creep in flexure are meager and are only for two types of beams, there is indication that the creep deflection curve of one type can be predicted from the creep curve of another, provided that both beams are loaded to less than 50 percent of their ultimate strength.

Fly Ash in Concrete The persistent references to the possibility of using fly ash beneficially in concrete and the fact that the society has tentative specifications and a tentative test method covering this material as an admixture for portland cement concrete prompted the preparation of two papers by members of the research staff of the physical research branch of the Bureau of Public Roads. R. H. Brink, highway physical research engineer, and W. J. Halstead, chemist, presented a paper on *Studies Relating to the Testing of Fly Ash for Use in Concrete*. A total of 34 fly ashes from 19 different sources were secured for a series of tests to determine the variations in properties which may be expected and the effect of these variations on the behavior of the fly ash in mortar. It was hoped that the information obtained would provide a suitable basis for the selection of fly ashes for use in concrete through tests in mortar.

The results of the tests indicate that the strength developed in mortar is related to the carbon content of the fly ash, the fineness of the fly ash as measured by the amount passing the number 325 sieve, and the water required for mortars containing fly ash as compared to the water required for similar mortars without fly ash. The tests indicate also that the effect on the strength of mortar of replacing a portion of the cement with fly ash varies according to the cement used. Furthermore, tests of

mortar-bars show that fly ash may be used to inhibit expansion resulting from alkali-aggregate reaction. It was found that the amount of fly ash required to reduce expansion below a safe limit varies for different fly ashes. Among the conclusions reached it was stated that fly ash has the greatest proportional benefit for lean mixes even though tests at 28 days generally show the reverse to be true. Also it was found that in general the strength of cement-fly ash mortars varied with the fineness of the fly ash as determined with the number 325 sieve, the finer fly ashes giving higher strengths. Laboratory tests to determine the amount of fly ash to be used to inhibit alkali-aggregate reaction are recommended, using the materials intended for the job.

Further tests were reported in *The Use of Fly Ash in Concrete* by Albert G. Timms and William E. Grieb, highway research engineers of the physical research branch, Bureau of Public Roads. Concrete cylinders made and handled in accordance with standard procedures and 3- by 4- by 16-in. prisms. The purpose of the investigation was to study the properties of concrete containing four fly ashes as replacement for a part of the cement content. These were from two widely separated areas and were selected because they represented sources of fly ash which have a history of extensive use in concrete. Two portland cements were used: one high-alkali and the other low-alkali. Concrete specimens containing the fly ashes were tested for strength at various ages, for shrinkage at various periods when stored in a dry atmosphere, durability in freezing and thawing, and resistance to attack of calcium chloride used for ice removal. The detailed conclusions were as follows:

1. The 7-day compressive strengths of concretes containing fly ash are lower than comparable concrete without fly ash. With a few exceptions, the same relation was found for the 28-day strengths. The lower strengths were always obtained with the concretes containing the fly ashes of highest carbon content. At 1 year the strength of the concrete containing fly ash of low carbon content was always higher than that of the concrete without fly ash, in some cases by as much as 20 percent, and the strength of the concretes containing 16⅔ percent of fly ashes X and Y equalled or exceeded those without fly ash. Only the concretes containing 33⅓ percent of fly ashes X and Y (high carbon content) failed to meet or surpass the strengths of the control concrete at 1 year.

John R. Dwyer (right) receiving gifts presented by R. R. Litehiser in behalf of the members of the committee on cement.

2. Much the same general relations hold for flexural strength as were obtained for compressive strength except that at 1 year the flexural strength of all concrete with fly ash replacement was greater than that of concrete without fly ash.

3. Non-air-entrained concrete with and without fly ash had poor resistance to freezing and thawing.

4. Satisfactory durability was obtained with the air-entrained concretes without fly ash but with cements A and B. For air-entrained concrete, satisfactory durability was obtained with the concretes containing cement B, the low-alkali cement, and the various fly ash replacements. Satisfactory durability was also obtained with the concretes containing cement A, the high-alkali cement, and the 16⅔ percent replacement of the four fly ashes and the 33⅓ percent replacement of fly ash A and B; but the concrete with 33⅓ percent replacement of cement with fly ashes X and Y (the high-carbon fly ashes) had poor durability, as indicated by durability factors of 40 or lower.

5. The effect on durability and strength of concrete containing fly ash from a given source of supply varies with the characteristics of the cement used. Therefore, for cement-fly ash combinations for which no service record is available, laboratory investigations should be made prior to use.

6. In general there was little difference in the shrinkage upon drying of the concrete made without fly ash substitutions and those containing various percentages of fly ash.

7. Non-air-entrained concrete with and without fly ash was severely attacked by calcium chloride used for ice removal. The two air-entrained concretes without fly ash had good resistance to attack by calcium chloride, but all substitutions of fly ash for portland cement lowered the resistance of the concrete.

8. The amount of air-entraining material necessary to produce a given amount of air in concrete increases with the carbon content of the fly ash.

Specifications Revised Committee C-1 on Cement re-elected R. R. Litehiser, chief engineer, Ohio State Highway Testing Laboratory, as its chairman and W. S. Weaver, research engineer, Canada Cement Company, Montreal, as vice-chairman. Because of the retirement of John R. Dwyer, former secretary and a member of Committee C-1 for 36 years, a new secretary was elected in the person of J. R. Dise, supervisor of the Cement Reference Laboratory. Mr. Dwyer, who had also served as supervisor of the Cement Reference Laboratory, was honored for his many years of service to the committee. He was presented an engraved watch, a billfold, and appropriate paper contents.

Two new honorary members were elected for Committee C-1 on consideration of their long service and valuable contributions: Perry J. Freeman, member for over 30 years, and John R. Dwyer, member since 1920, who has been technical assistant to the committee since 1931.

At the main meeting of Committee C-1 Clayton L. Davis, technical service director, Universal Atlas Cement Company, New York, and chairman of the Sub-Committee on Methods of Tests for Air Entrainment, addressed the committee on the history and development of the method of tests for determining the entrained-air content of cement mor-

tars (C 185-55T). The first series of tests leading to the current method was made in August of 1943 and was for the purpose of providing a means for establishing the amount of vinsol resin to be interground at the mill for optimum air entrainment. A weight-per-liter method was used by Wuerpel, Swayzee, Raber, and Klein. Shortly thereafter the Burmeister flow trough was designed and used in the co-operative test series.

William Lerch, chairman of the Subcommittee on Sulphate Resistance made an announcement suggesting that those who intend to attend the Pacific Coast meeting in September communicate with I. L. Tyler, Portland Cement Association, Chicago, to make arrangements to visit the California Highway Department's Sacramento experiment on sulphate resistance of concrete.

R. L. Blaine, National Bureau of Standards, called attention to an error in the information accompanying the standard sample of cement for fineness recently furnished by the Bureau of Standards. The value should have been shown as 1,870 square centimeters per gram instead of 1,670. Samples furnished with this erroneous information are being replaced without charge.

Committee C-1 recommended that tentative specifications for portland blast-furnace slag cement (C 205-53T) be revised in Table 2 to show the compressive strength requirements at 3, 7, and 28 days for type IS as 1,200 p.s.i., 2,100 p.s.i., and 3,500 p.s.i., respectively, and for type IS-A as 900 p.s.i., 1,500 p.s.i., and 2,800 p.s.i., for the three ages respec-

A change in the last sentence of Section I under the tentative method of test for calcium sulphate in hydrated portland cement mortar (C 265-55T) further describes the scope: "This method of test is intended for use primarily by manufacturers of portland cement and those interested in research on a suitable method of determining whether calcium sulphate has or has not been used in an amount considered to be optimum." The note at the end of Section 8 is deleted.

The methods of chemical analysis of portland cement (C 114-51T) is being revised by deleting Sections 6 through 11 covering Darex air-entraining agent. Special complex apparatus and analytical precautions required make continuation of these sections unwarranted in view of the minor use reported for the test.

The old time-honored Standard Method of Test for Soundness of Hydraulic Cement Over Boiling Water (Pat Test) (C 189-49) is being withdrawn since it is no longer used in any A.S.T.M. specifications.

Standard Specifications for Portland Cement (C 150-55) and Standard Specifications for Air-Entraining Portland Cement (C 175-55) are being recommended for revision and immediate adoption of requirements for fineness in order to bring them into more complete agreement with federal specifications which are soon to be established. The same fineness values will apply to Types I, II, IV and V as are currently standard for Type I, both for the Turbidimeter Test and the Air-Permeability Test, and for both Types I-A and II-A the current fineness applying to Type I-A will apply. With further reference to C 175-55 the strength requirements for Type III-A at 1 and 3 days will be 1,300 p.s.i. and 2,500 p.s.i, respectively.

Road and Paving Materials New officers of Committee D-4 on Road and Paving Materials elected to serve until the annual meeting in 1958 are: K. B. Woods, Purdue University, chairman; A. B. Cornthwait, Virginia Department of Highways, first vice-chairman; Fred Hubbard, Standard Slag Company, second vice-chairman; J. O. Izatt, Shell Oil Company, New York, third vice-chairman; and John M. Griffith, The Asphalt Institute, secretary.

Action pertaining to the Method of Test for Soft Particles in Coarse Aggregates (C 235-54) by Committee D-4 would change this title to read *Method of Test for Scratch Hardness of Coarse Aggregate Particles.*

Of some interest to the mineral aggregate industry is the recommendation that a new method of test be published as tentative for testing graded aggregate road mixes for certain water-soluble chlorides present as admixes. This is under the joint jurisdiction of Committees D-4 and D-18. The method is applicable, according to the stated scope, to the determination of water soluble calcium, magnesium, and sodium chlorides used as admixes in the preparation of graded aggregate road materials.

The first general session of the society's annual meeting on Monday afternoon was a symposium on the specific gravity of bituminous coated aggregates sponsored by Committee D-4 and specifically by subcommittee B-14 on Specific Gravity of Fine and Coarse Aggregates, H. T. Williams, chairman. Mr. Williams, who presided at the session, is materials engineer for the Duquesne Slag Products Company, Youngstown, Ohio.

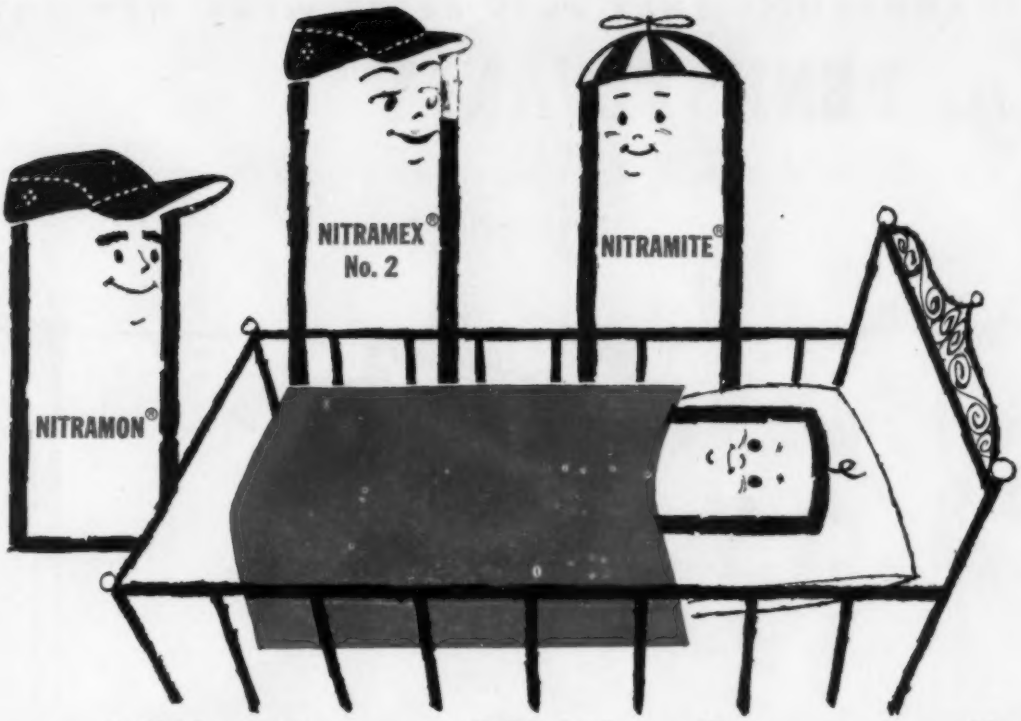
A new concept of specific gravity of the aggregates as they affect the design of bituminous paving mixtures is in the process of development. Neither the apparent specific gravity nor any of the bulk specific gravities give a value that can be used accurately in computing characteristics of bitumen-aggregate mixtures. The papers presented, using different approaches to the problem, gave valuable information which may be expected to yield a workable plan for computing densities, voids, and other characteristics of compressed bituminous mixtures by the use of a standard test method for what is referred to as "effective specific gravity." Attempts are being made to determine the mix characteristics without the determination of specific gravity of either the aggregates or the aggregate-bitumen combination.

Concrete Pipe The Concrete Pipe Committee (C-13) underwent extensive subcommittee reorganization through the establishment of four new subcommittees. The new list of subcommittees, which includes several of those previously existing, includes Subcommittee I on Non-Reinforced Sewer Pipe (Specification: C 14), Carl A. Bluedorn, chairman; Subcommittee II on Reinforced Sewer and Culvert Pipe (Specification: C 75 and C 76), C. M. Adams, chairman; Subcommittee III on Irrigation and Drain Pipe (Specification: C 4 and C 118), P. W. Manson, chairman; Subcommittee IV on Low-Head Pressure Pipe (Specification: C 361), Howard G. Curtis, chairman; Subcommittee V on Low-Head Internal Pressure Sewer Pipe (Specification: C 362), J. A. Dunn, chairman; and the Subcommittee on Absorption Test, under a new chairman, J. W. Johnston. The officers for Committee C 13 and members of the Advisory Committee continue as heretofore with R. R. Litehiser, chairman, E. F. Bespalow, vice-chairman, and Howard F. Peckworth, secretary.

The board of directors of the society took action in January, 1956, to transfer jurisdiction for concrete drain tile from Committee C-15 on Manufactured Masonry Units to Committee C-13, although co-ordination between the two committees in the matter of concrete drain tile is to be effected. Clay drain tile is to continue entirely under the jurisdiction of Committee C-15.

Certain revisions were recom-

(*Continued on page* 104)



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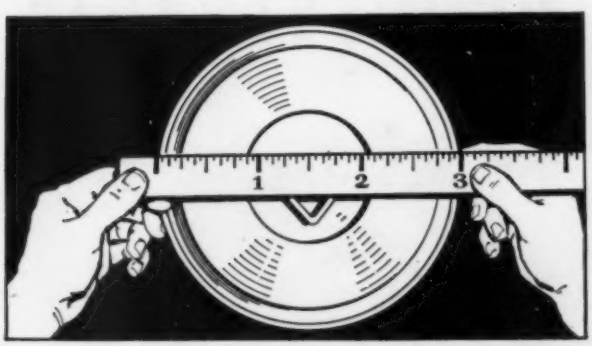

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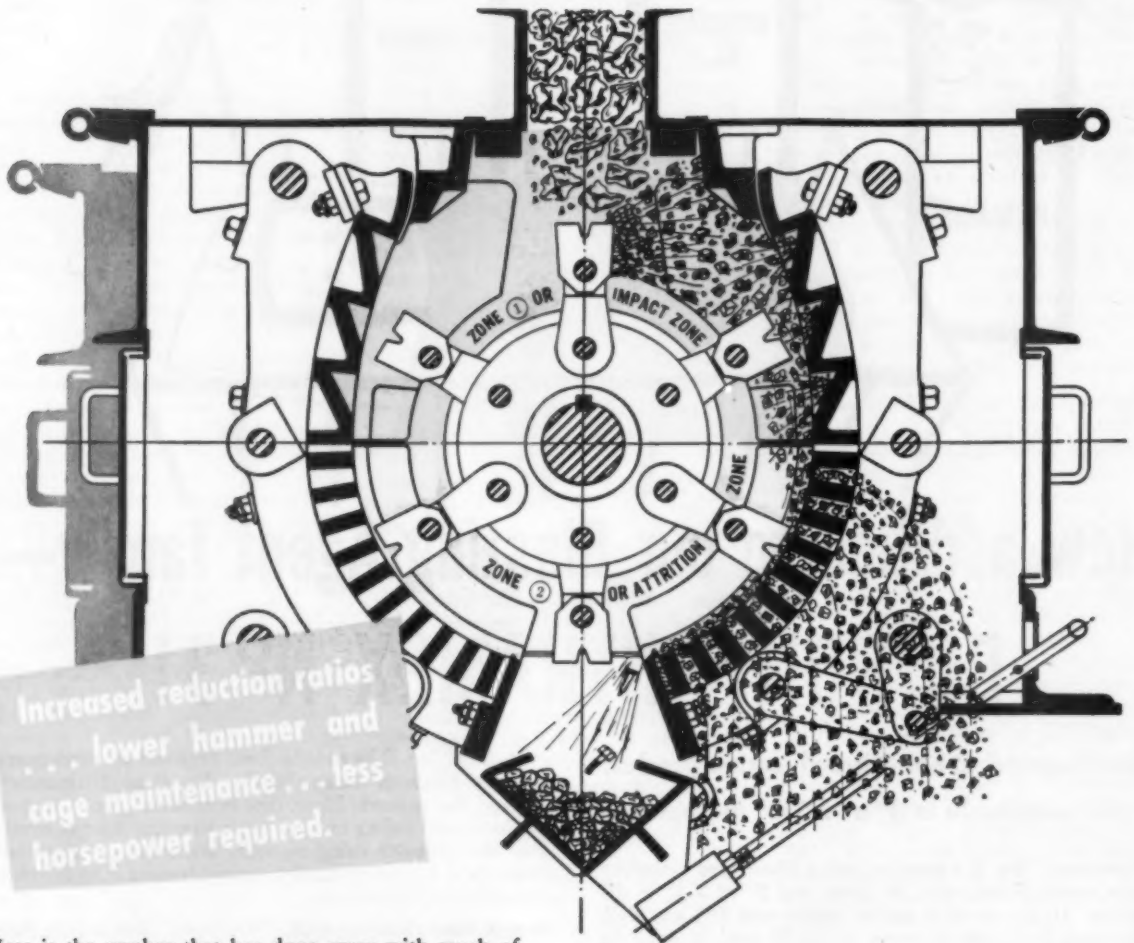

Increased reduction ratios . . . lower hammer and cage maintenance . . . less horsepower required.

Here is the crusher that has done away with much of the wear on screen bars and hammers that is expected in hammermills of conventional design. Examine the illustration above. Note that most of the size reduction takes place in the upper or impact zone by free air impact, without any attrition action. Only when particle size is greatly reduced does material being crushed reach the attrition zone where hammers force feed through the cage bars to give a uniform sized product. Thus attrition and wear is held to a minimum. Then too, the reversible feature doubles hammer life and eliminates down time and labor cost of turning hammers. Ask for Bulletin No. 1034 that gives complete details.

PENNSYLVANIA CRUSHER DIVISION

Bath Iron Works Corporation • West Chester, Pa.

PENNSYLVANIA

Thousands of crusher installations plus 50 years experience designing and developing size reduction machinery makes our engineering staff an outstanding group to consult with on crushing problems.

PE-208

More Information, Please

Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.

AIR HOSE, manufactured by the B. F. Goodrich Industrial Products Company, is the subject of a bulletin available without charge. Types of hose reviewed include Highflex, recommended for small shop tools; Type 50, recommended for quarry service, ore mining, and other general uses; Commander, recommended for rugged uses in mines and quarries; Type 88, an air, manifold and jetting hose recommended for heavy-duty service in mines and quarries. (1)

BULLETIN NO. 30-C, published by *Robbins & Myers, Inc.*, presents Moyno progressing-cavity pumps for pumping practically anything from free-flowing liquids to non-pourable pastes, clean or contaminated with abrasives, chemically inert or inactive. Principles of operation, features, and advantages are included, in addition to diagrams, charts, and photos. (2)

M-H-F WORK BULLS, a new line of industrial tractors, 34 to 52 hp., with integrated front and rear attachments for a wide range of applications, are featured in an illustrated booklet released by *Massey-Harris-Ferguson, Inc.* Work Bull Models 202, 303, 404, 202 Forklift, and the Davis Pit Bull are described in detail. Illustrations show each model in its various applications, using the different attachments. Specifications are given for each model. (3)

DAVIS ATTACHMENTS FOR M-H-F WORK BULLS are pictured in a bulletin available from the manufacturer, *Mid-Western Industries Inc.* Application photos show the Davis attachments in use on the various Work Bull models. Attachments are also adaptable to other tractors. (4)

BULLETIN NO. 60-A, available from *The Farval Corporation,* provides detailed information on Farval spray lubrication systems for open gearing and slide surfaces. The 3-color, illustrated booklet offers descriptions of manual and automatic systems and component equipment with schematic layouts, as well as actual application views. (5)

"LONG BODY" BOTTOMING TYPE PERCUSSION BITS and carbide blanks for bottoming drive rods are featured in a new 8-page catalog offered by the *Vascoloy-Ramet Corporation.* Charts specifying 19 sizes of the "long body" bit are included. Also described are V-R bits and blanks for 7 types of shoulder drive rods and 11 sizes for push-on rods. All bits are specified as to thread type and diameters available. (6)

AN ILLUSTRATED, INDEXED CATALOG describing the principal products of *The Colorado Fuel and Iron Corporation* is now available. The product listing is divided into broad classifications which include wire and wire products, Wickwire rope, overhead conveying equipment, industrial screens and wire fabrics, and processing belts. (7)

A NEW ENAMEL and a rust-resistant top coat primer for use on all heavy equipment such as earth movers, tractors, trucks and in-plant machines is being introduced by the *Robeson Preservo Company.* The enamel, which comes in 14 high gloss colors, has high cover and good color retention. Applied with either brush or spray, one coat of primer and one coat of finish is claimed to be all that is required on any metal. (8)

A NEW COUPLING SELECTION CHART, devised by the *Morse Chain Company,* simplifies the selection of flexible coupling. Main horizontal headings of the 22- by 17-in. chart are the three coupling types (Roller Chain, Morflex, and Silent Chain) and sizes, with the bore diameter range of all coupling halves. N.E.M.A. electric motor frame numbers, both old and new, are listed at the extreme left, and shaft sizes are listed in the second column. Bore diameter range is indicated by a color code. (9)

MODEL LFW-1, a new lubricant-friction-wear testing machine, has been developed by *The Alpha Molykote Corporation* for testing bonded coating and liquid lubricants. Features include a pre-setting device, which automatically shuts off the machine after it reaches a pre-determined coefficient of friction, and high loading accuracy. (10)

A NEW, LARGER BELT HOOK for use with belts ⅝ in thick is now available from the *Clipper Belt Lacer Company.* Called the No. 7, the new hook features a double-staggered grip to provide even distribution of hook-point pull on the belt. The No. 7 is said to withstand easily pulls up to 125 lb. per hook. (11)

THE PROPER HANDLING OF WIRE CABLE is illustrated on a 10- by 22-in.

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SEPTEMBER, 1956

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poster distributed by the *Anaconda Wire and Cable Company*. Illustrations show results of improper handling. A table presents causes of damage, evidence of damage, and suggestion for avoiding cable troubles. **(12)**

M-S-A "S" LINE WELDING HELMETS and equipment are described in a new bulletin recently prepared by the *Mine Safety Appliances Company*. The glass fiber face protectors are manufactured in several models, including a combination welding helmet and Skullgard, to protect the welder's head. All are strong, lightweight, and resistant to heat and moisture. **(13)**

A 4-PAGE BROCHURE, available from the *Sparton Control Systems Division, The Sparks-Withington Company*, covers plug-in package remote control systems for two-position discreet operation of starters, pumps, valves, loaders, gates, operators, etc. Systems which can be used with existing controls are described. **(14)**

THE EMERY LOAD CELL, designed specifically for bin, tank, and hopper weighing systems by the *A. H. Emery Company*, features off-center loading stability. Force on the cell loading platform is transduced into hydraulic pressure. This pressure is used to actuate an indicator, recorder, or controlling device. **(15)**

PRINCIPLES OF UNITIZED DUST COLLECTION are described in a booklet titled *You Can Solve That Dusty Cost Problem*, available from the *Torit Manufacturing Company*. Illustrated with cartoons, cutaways, and product photos, the booklet discusses dust damage, general product information, and uses. **(16)**

BULLETIN 500-A, a 36-page booklet describing the products and services of the *Fawick Airflex Division, Fawick Corporation*, is now available for distribution. Included in the book are history, applications, and design data on Fawick Airflex clutches, brakes, couplings, power take-offs, rotorseals, quick release valves, and high-speed controls. **(17)**

THE 17TH EDITION OF THE PACKAGING AND CARLOADING GUIDE, just published by the *Signode Steel Strapping Company*, tells how to package and carload for maximum product protection at minimum cost. Strapping, seals, strapping tools, and retaining strips are some of the products shown and described. Application instructions are given. **(18)**

INSTALLATION, OPERATION, AND SERVICE INSTRUCTIONS for Hydrostarter systems for diesel engines are presented in a catalog available from *Aeroproduct Operations, Allison Division, General Motors Corporation*. Drawings, photos, and data sheets supplement the information presented. **(19)**

CLEANING TOOLS for removing paint, scale, rust, and other accumulations from steel and all hard surfaces are the subject of a folder recently published by the *Aurand Manufacturing & Equipment Company*. The cleaning action of the tools is supplied by many cutters loose-pinioned around the rotating head, which are thrown against the surface being cleaned. **(20)**

HYDRAULIC PRESSURE EXCHANGE PUMPS have been designed by the *Manton-Gaulin Manufacturing Company, Inc.*, to handle corrosive and erosive slurries and solutions at high temperatures. Design eliminates plungers, stuffing boxes, plunger packing, and other items which require extra maintenance. **(21)**

THE EX-CELL-O STYLE 49-A GRINDER as applied to the sharpening of mining machine tool bits and rock drills is described in a new bulletin being distributed by the *Ex-Cell-O Corporation*. Particular reference is made to grinding carbide tipped tools. **(22)**

THE INSTITUTE OF MAKERS OF EXPLOSIVES is distributing a new poster and pamphlet to miners, quarry operators, and other users of commercial explosives as part of its continuing campaign to safeguard children against the dangers of blasting caps. The 4-color poster warns "Blasting caps can cripple and blind! Lock 'em up so kids can't get at them." The pamphlet emphasizes the fact that blasting caps are safe in experienced hands, but dangerous to children. **(23)**

HEAVY-DUTY, SINGLE-STAGE HYDRAULIC TORQUE CONVERTERS for transmission of 100 to 1,000 hp. to excavating, earth-handling, and construction machinery are described in Bulletin No. 468, recently issued by the *National Supply Company*. The bulletin gives features and specifications of 17 sizes and capacities of torque converters for exact matching with engines in this power range. **(24)**

SEPTEMBER, 1956

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59th A.S.T.M. Meeting

(*From page* 98)

mended by the committee for immediate adoption to apply to Standard Specifications C 14-55, C 75-55, C 76-55, and C 118-55 as follows:

The paragraphs on drying specimens in all four specifications are changed to read as follows: "Specimens shall be dried in a ventilated oven at a temperature of 105 deg. to 115 deg. C (221 deg. to 239 deg. F.) until two successive weighings at intervals of not less than two hours show an increment of loss not greater than 0.1 percent of the original weight of the specimen."

Also section 29(i) in Specification C 14 is recommended to be changed to the following:

"(i) The complete absence of distinct weblike markings from the external surface of pipe made by any process in which the forms are removed immediately after the concrete has been placed, which is indicative of a deficiency of water in the concrete mix, unless all specimens submitted for test which do not have such weblike markings shall have passed the physical tests herein required."

This same paragraph, which describes one of the criteria for nonacceptability of the pipe, will be included in the other three standard specifications mentioned above.

Applicable only to standard specifications for reinforced concrete sewer pipe and reinforced concrete culvert pipe (C 75-55 and C 76-55 respectively), is the following change to be made in Section 31(b) of C 75 and Section 33(b) of C 76:

"(b) Variations of the position of the reinforcement shall not exceed one-tenth of the wall thickness, but in no case shall the allowable variation be less than ¼ in. nor more than ⅜ in. from the position provided in the design; but the cover on the reinforcement shall not be less than ¾ in. at any point.

Manufactured Masonry Units The Committee on Manufactured Masonry Units (C-15), under the chairmanship of J. W. Whittemore, dean of engineering, Virginia Polytechnic Institute, Blacksburg, Va., reported the adoption of tentative revisions of standard specifications for building brick (C 62) and facing brick (C 216) and methods of sampling and testing brick (C 67) which appear in the 1955 book of standards. Work of the subcommittees includes the use of sulphur for capping compression test specimens of clay brick and structural clay tile. Another subcommittee has been studying methods for determining the effectiveness and durability of moisture-proof coatings for unit masonry walls.

Soils Of some interest to those who are concerned with subsurface explorations will be the recommended tentative methods proposed by Committee D-18 on Soils for Engineering Purposes, titled as follows: *Method for Soil Investigation and Sampling by Auger Boring, Method of Thin Walled Tube Sampling of Soils,* and *Method for Penetration Testing and Split Spoon Sampling of Soils.*

Lime Fly Ash A proposed tentative specification for fly ash for use as a pozzolanic material with lime has been recommended by the Committee on Lime (C-7), James A. Murray, Massachusetts Institute of Technology, chairman. Some of the requirements stated in the specification include moisture content, water-soluble fraction, fineness on the number 30 and number 200 sieves, lime-fly ash pozzolanic strength at 7 days and 28 days, and alkali-fly ash pozzolanic reactivity. Descriptions of the test methods are included in the specifications.

Gypsum The Gypsum Committee (C-11), re-elected its officers for an additional term of two years. Chairman G. W. Josephson, U. S. Bureau of Mines, Washington, D. C., reported that revised tentative specifications for precast reinforced gypsum slabs (C 337-56T) is available as a separate reprint. The standard methods of testing gypsum and gypsum products (C 26-54) is recommended for revision and immediate adoption as standard. Some of the proposed revisions include the exclusive use of standard Ottawa sand in Section 18(c) and modifications of Sections 22(a) and (b) describing the normal consistency of gypsum and gypsum mortar. The use of 2- by 4-in. cylinder molds instead of cube molds for determination of compressive strength is permitted. There are numerous editorial revisions, deletions, and additions which should be reviewed carefully by those who are interested in the manufacture and testing of gypsum products. Copies of the revisions may be secured from A.S.T.M. headquarters.

Members Honored By A.S.T.M. Awards and honors conferred upon members of the society, in addition to those of the elective offices, increase in their value and meaning with the passing years and growth of the organization. Although 50-year personal memberships obviously will be infrequent, this distinction was recognized in two persons: Charles E. Fuller, professor emeritus, theoretical and applied mechanics, Massachusetts Institute of Technology, and Earl B. Smith, mechanical engineer, National Bureau of Standards. Among those honored as 40-year members were Frank H. Jackson, principal engineer of tests (retired), Bureau of Public Roads, who is also an honorary member of the society; Lewis A. Eisenhard, chief chemist, Dragon Cement Company, Inc., Northampton, Pa.; Roy M. Green, dean of engineering, University of Nebraska; and Wylie B. Wendt, professor emeritus, civil engineering, Speed Scientific School, University of Louisville, Louisville, Ky.

The Award of Merit given each year to members of the society who have rendered outstanding service included three well known personalities in the field of mineral aggregates and allied interests. These individuals and their citations are as follows:

"To Harrison Frederick Gonnerman, consulting engineer and research consultant, Oak Park, Ill., in recognition of outstanding service, especially for standards and research work in Committee C-1 on Cement, and in the field of concrete, and for consistent support of other varied A.S.T.M. activities.

"To Fred Hubbard, consulting engineer, The Standard Slag Company, Youngstown, Ohio, in recognition of distinguished and long-time service to the society, especially in Committee D-4 on Road and Paving Materials, and for support of other important A.S.T.M. work.

"To John W. McBurney (retired), consultant on masonry and masonry materials, National Bureau of Standards, Washington, D. C., in recognition of long-time sustained work in the field of building materials, particularly in Committee C-12 on Mortars for Unit Masonry, and C-15 on Manufactured Masonry Units."

Each year an outstanding scientist is selected to present the Edgar Marburg Lecture. This year the lecture commemorating the name of the first secretary of the society was presented by Dr. Charles E. Reed, general manager, Silicone Products Department, General Electric Company, on the subject *The Industrial Chemistry, Properties and Applications of Silicones.* The lecture proved

(*Continued on page* 127)

Lubrication
Of Heavy Construction Equipment
In Pit and Quarry Industries

By R. K. GOULD
and
E. J. BOWHAY

Research and Technical Department
The Texas Company

Courtesy of Allis-Chalmers Mfg. Co.

Combination of a 15-cu. yd. struck capacity scraper and crawler tractor.

PART II
PREVENTIVE MAINTENANCE

To the producer striving to complete his job on time, equipment maintenance is (or should be) of prime importance. A piece of machinery which must be pulled off the job for repairs represents lost time. Also, equipment not operating at top efficiency can have far-reaching effects. For example, a sluggish push tractor may upset the smooth operation of an entire fleet of scrapers; the breakdown of a single haul unit may mean delays to a big loader; and the breakdown of a loader—even for a short time—may delay a long series of operations.

Although the lesson has been learned the hard way, experience has proven that in the long run it pays to take care of equipment on the job and not neglect it. A program of preventive maintenance, well planned and properly executed, will pay for itself over and over. For example, it is much cheaper to keep a bearing adjusted than it is to buy new bearings, shafts, and gears that are damaged when unadjusted bearings fail. Major breakdowns, lost time, and high operating costs can be kept to the minimum by keeping parts lubricated, tightened, and adjusted. Furthermore, an operator whose equipment is always in good condition is very apt to be a happy, satisfied employee.

Since no two jobs are exactly identical, the actual details and execution of preventive maintenance programs will necessarily vary from job to job. However, there are a few basic concepts which are common and essential to all successful programs.

1. Set up a definite schedule for lubrication and mechanical checkups and *stick to it strictly.* Any program will begin to fall apart and become ineffective if exceptions are made and one starts to "cheat" on the original schedule. For example, if it is found that the interval between lubricant changes can be increased a certain amount with no apparent adverse effect, the natural tendency is to extend it further and further. Such practice will inevitably lead to disaster.

2. If possible, have the preventive maintenance work performed on an off-shift, as this will cause the minimum of interference with the productive effort.

Courtesy of Bucyrus-Erie Co.

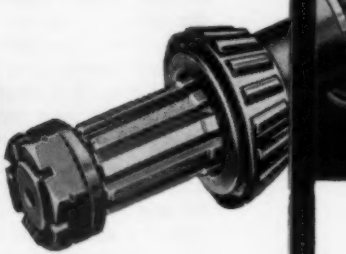
A 3-cu. yd. shovel with a full dipper of granite rock.

The turnabout that made possible a new tool

the new TDA®

WIDE RANGE®

2-speed axle



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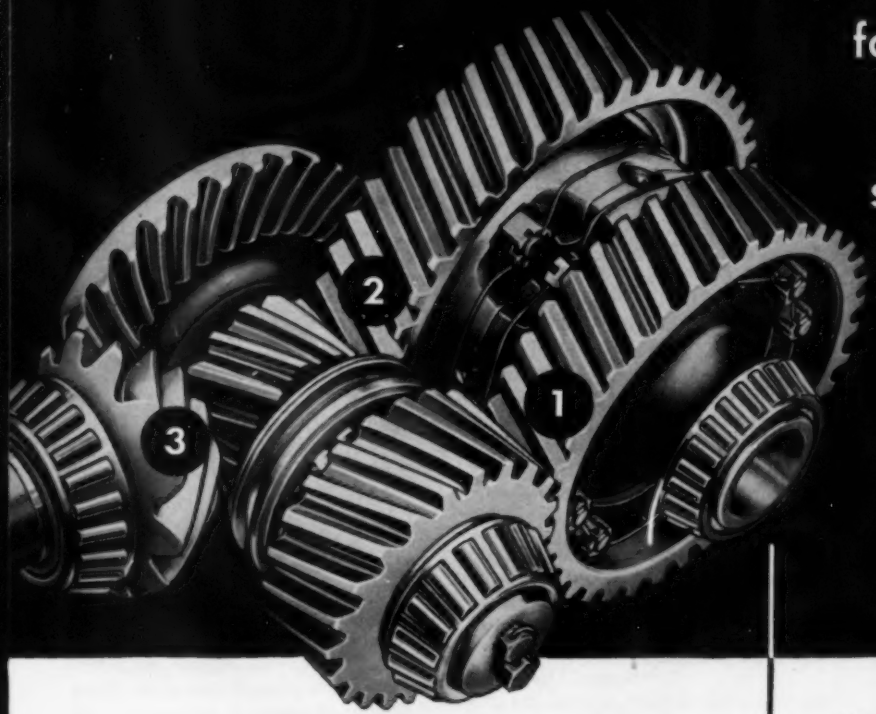

for operations requiring short transmission steps and high over-all gear reduction

The new TDA WIDE RANGE 2-Speed Axle (available in both 2 to 1 and 2½ to 1 ratio spreads) offers all the highly desirable advantages heretofore available only through the use of complex multiple-speed transmissions or auxiliary gear boxes, without many of the penalties of either one or the other:

WITHOUT laborious two-stick shifting.

WITHOUT wasteful excessive weight.

WITHOUT increased driver fatigue.

WITHOUT unusual wheelbase limitations.

WITHOUT higher initial vehicle cost.

WITHOUT higher maintenance cost.

WITHOUT excessive wear on the lower speed gears of the transmission.

WITHOUT restricted over-all gear reduction.

WITHOUT complicated shift patterns.

For complete information on the new TDA WIDE RANGE Axles now available, call, wire or write your nearest vehicle dealer or branch.

Here's the simple switch that turned the trick!

The broader range of the new Timken-Detroit® WIDE RANGE 2-Speed Axle was achieved by a fairly simple mechanical rearrangement. We "flipped" our high-range (1) and low-range (2) helical gear sets—reversed their relative positions—to place the enlarged helical pinion of the high-range gear set where it would not interfere with the hypoid pinion (3) of the first-reduction gear set.

Plants at: Detroit, Michigan • Oshkosh, Wisconsin Utica, New York • Ashtabula, Kenton and Newark, Ohio • New Castle, Pennsylvania

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ROCKWELL SPRING AND AXLE COMPANY

DETROIT 32, MICHIGAN

Accepted D A Standard

WORLD'S LARGEST MANUFACTURER OF AXLES FOR TRUCKS, BUSES AND TRAILERS

A 6-cu. yd. shovel moving soapstone and sand rock.

Courtesy of Baldwin-Lima-Hamilton Corp.

3. Assign men to this job who are familiar with lubricants and who are thoroughly acquainted with the equipment. The consequences are too great to entrust this work to uninformed personnel.

4. Keep accurate records of the servicing done on each piece of equipment. This need not be a complicated procedure. Only a few simple check marks on a printed form are required. A study of such records will usually serve as a warning of possible trouble. For example, excessive oil consumption is evidence of poor lube fittings or oil leaks—items which can be checked at once by the mechanic. Also, these records will indicate when the machine is nearing the overhaul stage.

5. Keep on hand a stock of parts and expendable supplies. If they are available when needed. equipment requiring new parts will be out of service for the minimum amount of time.

6. Clean equipment before servicing. On the face of it, this may seem ridiculous, since the machines will become dirty again as soon as they are put back into service. However, there are two good reasons for following this practice. First, the lubrication fittings will be uncovered, and the chances of any points being missed will be reduced. Fittings caked over with mud may be overlooked. Second, there is less chance of dirt from the machine contaminating the lubricant at the moment of application.

These, then, are some points that should apply to any good preventive maintenance program. As mentioned earlier, the actual details of carrying out such a program must be worked out for each individual job. Usually, it is more difficult to set up an ideal program on short-term jobs than on those that last for an extended period. As far as lubrication is concerned, the critical points are those which must be lubricated frequently and the critical time is at the start of the job.

SERVICE SUGGESTIONS

Some useful service hints on various parts of construction equipment are outlined as follows:

Air Compressors Keep valves clean to avoid excessive discharge temperatures and keep receivers drained of any accumulated oil. Service air cleaners every 5 to 10 hours, if necesesary.

Ball and Roller Bearings Ball and roller bearings often have seals to prevent grease leakage. If seals are in good condition, a grease charge should last about 200 hours. Use a low-pressure gun and apply only a few shots unless the bearing is vented. Forcing grease around the shaft will break the seals. Fill the bearing between ¼ and ½ of capacity.

Brakes Do not over-lubricate wheel bearings, as excess lubricant may reach the brakes.

Since hydraulic brake mechanisms often contain rubber parts, use only approved fluids which will not affect them.

Cables and Wire Ropes Do not lubricate cables that drag in the dirt. Cable which winds on drums equipped with clutches should be lubricated sparingly to prevent the possibility of lubricant reaching clutch faces.

Other cables should be cleaned every 10-100 hours as necessary to avoid dryness, and cable lubricant should then be applied.

About every 500 hours cables should be immersed for a minute or two in heated cable lubricant, using a trough built especially for this purpose. Usually this is a horizontal trough equipped with pulleys arranged to keep the cable submerged while it is run through. A burlap collar wipes off excess lubricant before the cable leaves the trough.

Chains In order to lubricate the pins of silent chains, remove the chains every 50 hours, wash in diesel fuel or kerosene and soak in hot gear oil.

Clutches Use low-pressure gun and do not over-lubricate clutch parts. Lubricant on clutch facings will cause slipping.

Electric Motors Inspect grease-lubricated bearings every 2,000 hours. If grease has deteriorated or if dirt is present, clean and repack and add grease to the housing until one-third full. Add a small amount of grease every 1,000 hours, but do not over-lubricate.

Check the oil level oif oil-lubricated bearings regularly. Wash out bearings every 2,000 hours. Do not flood bearings and wipe off any excess oil.

Gasoline and Diesel Engines Crankcase — The drain period recommended by the engine manufacturer covers normal operation. More frequent draining is necessary if oil temperatures are above normal, if engines are started and stopped often (or idled) for long periods, if the atmosphere is very dusty, or if the oil has been diluted to facilitate starting. Generally, oil should be drained from engines of construction machinery at 50-hour intervals. Where operating conditions are not too severe, 100-hour drain periods are entirely practical. On the other hand, if the filter or oil shows excessive contamination, filter cleaning and oil drain periods should be shortened. Extending the oil drain period is poor economy, since additional wear and deposits due to greater oil contamination will cause greater maintenance and shorten equipment life. Copper or white metal specks on the filter often serve as warning of incipient bearing difficulties.

Drain oil while it is hot—this is a must! If the oil filter is removed when draining oil, add an extra quantity when refilling the crankcase. Check the oil level every 10 hours, after the engine has been stopped for a few minutes to allow

the oil in the upper part of the engine to return to the case. When changing brands of oil, even to one manufactured by the same supplier, it is advisable to drain the crankcase at the end of the first 24 hours of operation to remove old oil deposits loosened by the new oil.

Crankcase ventilator air cleaners should be serviced when oil is drained.

Air Cleaners — Air cleaners may be of the wire gauze type in which the gauze is either replaced with a new element or washed in kerosene or diesel fuel, dipped in oil and reused. Usually any heavy oil (SAE 50) is satisfactory for coating the oil-wetted type.

The oil-bath-type cleaner requires inspection at 5- to 50-hour intervals to keep the oil at the proper level and the oil cup clean. Stick a screwdriver down into the oil, and if the sediment is ¼ to ½ in. deep, the unit should be cleaned and refilled. The entire assembly should be taken apart and cleaned every 500 hours. Carryover of oil into the intake manifold indicates that the engine has been over-speeded, the oil is too light, or the air cleaner is too small. Do not remove the oil cup when the engine is running.

Centrifugal precleaners should be emptied when the glass container is half full.

Cooling System—To insure complete combustion and to avoid contaminating the lubricating oil with fuel soot, engine cooling systems should be maintained at about 180 deg. F. This requires the use of shutters or other covering over the radiator when starting up or operating at light load in cold weather. In hot weather special attention should be paid to the fan belt, radiator, and water jacket to maintain the cooling system at maximum efficiency. Thermostats must be checked frequently by noting whether the radiator remains cool until the engine has reached proper operating temperature as shown by the indicator on the dash.

Permanent-type anti-freeze solutions are preferred for construction machinery engines since alcohol boils at about 170 deg. F., and most cooling system thermostats are set above this figure for efficient combustion of the fuel. Kerosene and salt solutions should never be used.

Distributors — The lower part of the distributor often is lubricated automatically from the engine. When driven from the generator, however, separate grease lubrication is usually required.

The upper distributor bearing may require either grease or oil lubrication. The wick under the distributor rotor requires two or three drops of light oil. An occasional touch of grease to the cam shaft is desirable; however, it is necessary to make sure that none reaches the breaker points.

Courtesy of the Thew Shovel Co.

A 15-ton crane with clamshell bucket loading trucks in sand pit.

Fans—Fans mounted on the extension of the shafts of other engine accessories and having no separate bearings require no lubrication. Neither do those having permanently-packed bearings.

Some fans require occasional grease application, while others must be lubricated regularly with oil. One type of oil-lubricated fan is equipped with an overflow, while another is provided with a standpipe to insure constant oil level. In the latter type, the reservoir is filled with oil and the excess is drained by turning the fan until the filler hole is down. If over-lubricated, fans may throw grease or oil on the belts.

Oil Filters—Clean or replace the filter element at every oil change or more often under severe dirt conditions. Low temperature operation requires more frequent filter changing because condensation forms an emulsion with the oil.

Oil filters do not remove fuel dilution or soluble oxidation products. Therefore, crankcase oil must be changed regularly, regardless of the filter type. Bypass filters do not remove all of the finely dispersed soot. Consequently, where these filters are used, detergent oils may turn dark quickly in service. This is a sign that they are functioning properly.

Water Pump — Some require no lubrication, since they are lubricated either automatically from the engine or permanently packed at the factory.

Others have a wick leading from an oil sump, and some have porous

(*Continued on page* 114.)

Loading a truck with a 10-cu. yd. shovel.

Courtesy of Marion Power Shovel Co.

ON THE JOB: (top to bottom) F-500 load lugger in the quarry makes up to 40 trips a day to crusher. At the plant F-800 spreader loads up. F-800 leaves plant as F-500 dumps quarry load into crusher. F-800 calls on 212-h.p. engine to spread lime over plowed field.

BIG FLEET OWNERS BUY MORE FORD

"FORDS ARE COST CRUSHERS- with an extra ton of payload!"

"The F-800's 212-h.p. engine keeps us from bogging down in freshly-plowed fields," says Charles Conklin of Canaan, Conn.

Mr. Charles Conklin, President of Conklin Limestone Company, says:

"Fords reduce costs on a low profit operation. Our '56 F-800 handles a ton more payload than competitive makes."

Extra ton of payload . . . "We can carry 9 tons in our Ford F-800 spreaders. That's a ton more than we can carry with a competitive make," says Mr. Conklin. "And with a low cost product like limestone, that extra ton means a lot." Payload means a lot in any operation, Mr. Truck Operator. And the Ford F-800 is just one of the Ford Truck line with an eye for better payloads. The new F-800 payload and body allowance is up to 18,445 lbs.!

72,000 miles with a worry-free V-8 engine . . . "We have a '54 F-800 spreader with 72,000 miles. The extent of repair to date has been spark plugs, points and minor adjustments." Ford Trucks prove they can "take it" under the roughest conditions. That's why *FORD TRUCKS LAST LONGER.*

Powered for the roughest jobs . . . "Our F-800 spreaders tackle some of the roughest terrain in New England," boasts Mr. Conklin. "But, thanks to Ford power, we never get bogged down." Take a look at the '56 F-800's power plant. Your choice of the 200-h.p. Torque King or the 212-h.p. Torque King Special—the most powerful engine ever offered in a Ford Truck.

So consider *everything* when you go to buy that new truck—initial price, running costs, dependable performance, and resale value. Check with your Ford Dealer and see why Ford Trucks cost less.

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TRUCKS THAN ANY OTHER MAKE

KOEHRING WORK CAPACITY *in action . . .*

At a Mid-West quarry, ¾-yard 305 loads out lannon stone. It's another in a new series of Koehring machines, and is similar in basic design to the modern new ½ and 1-yard excavators. Has full complement of standard attachments, on crawlers and rubber (see capacity chart below).

Plenty of pick-up — At an isolated camp in the Sierras, pumps and other machinery had to be unloaded and set in place. The heavy units required careful, precision-handling — and plenty of lift capacity. Above photo shows how they did it with a Koehring 15-ton 205 truck crane.

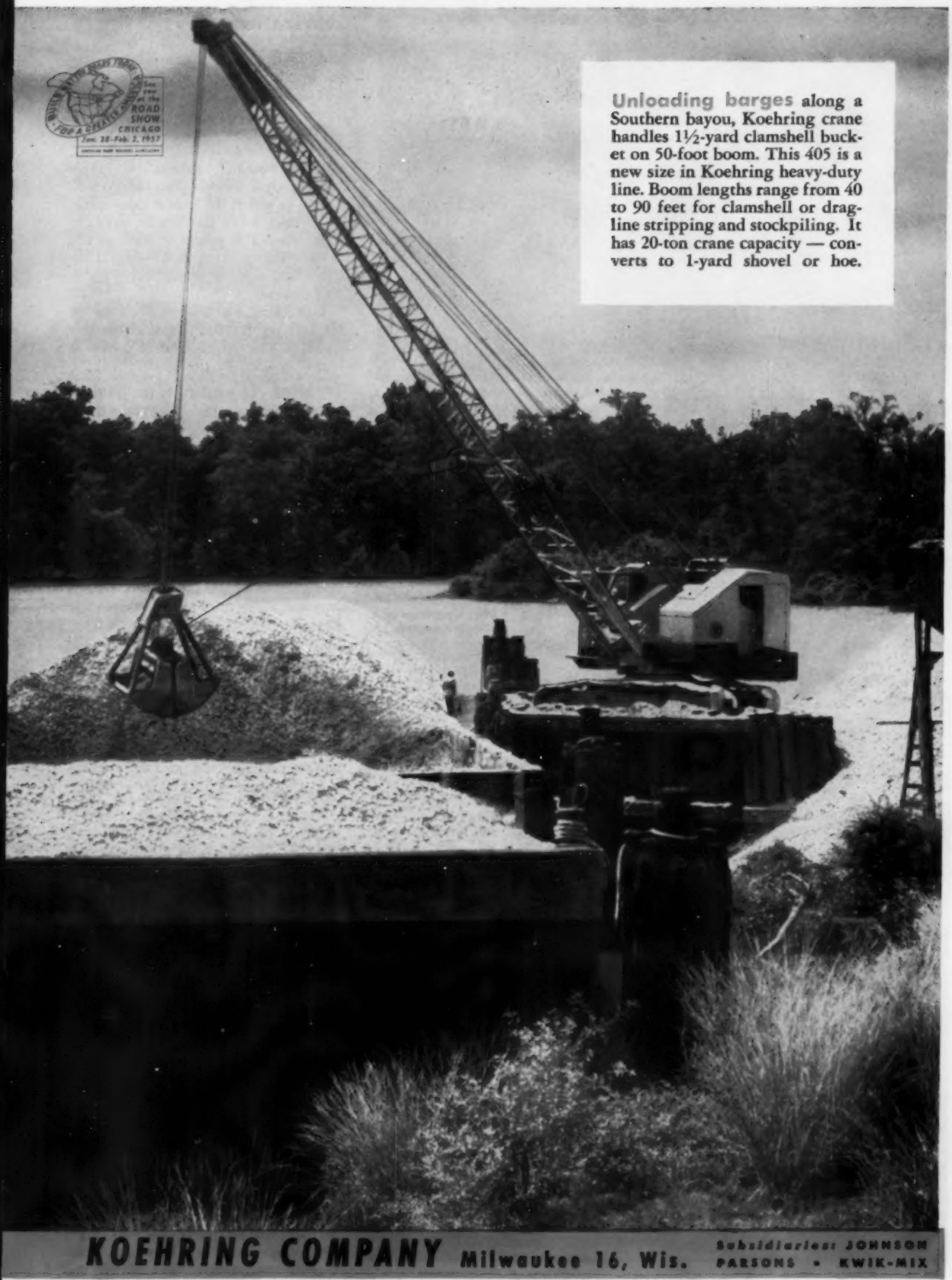
Here are some figures that will interest you:

KOEHRING MODEL	SIZE DIPPER	LIFT CAPACITIES (Crawler ratings based on 75% of tipping load. Rubber-tired machines — 85% of tipping load.)	
205 CRAWLER	½-Yd.	20,000 lbs.	at 10-foot radius
205 ON RUBBER	½-Yd.	30,000 lbs. 13,700 lbs.	at 12-foot radius at 20-foot radius
305 CRAWLER	¾-Yd.	30,000 lbs.	at 12-foot radius
305 ON RUBBER	¾-Yd.	50,000 lbs. 15,800 lbs.	at 10-foot radius at 30-foot radius
405 CRAWLER	1-Yd.	40,000 lbs.	at 12-foot radius
605 CRAWLER	1½-Yds.	72,300 lbs.	at 12-foot radius
1205 CRAWLER	3-Yds.	190,000 lbs.	at 13-foot radius

Want more information? Call Koehring distributor today.

K693

Big producer — Deep stripping uncovered a heavy coal vein at this Eastern mine. Working on mine floor, a Koehring 605 shovel loaded out the coal, and dumped into trucks spotted on upper level. Depending on materials, and type of operation, the 605 can be used with standard 22-ft. shovel boom and 16½-ft. dipper-sticks — or with high-lift 28-ft. boom and 23-ft. dipper-sticks.



Unloading barges along a Southern bayou, Koehring crane handles 1½-yard clamshell bucket on 50-foot boom. This 405 is a new size in Koehring heavy-duty line. Boom lengths range from 40 to 90 feet for clamshell or dragline stripping and stockpiling. It has 20-ton crane capacity — converts to 1-yard shovel or hoe.

KOEHRING COMPANY Milwaukee 16, Wis. Subsidiaries: JOHNSON • PARSONS • KWIK-MIX

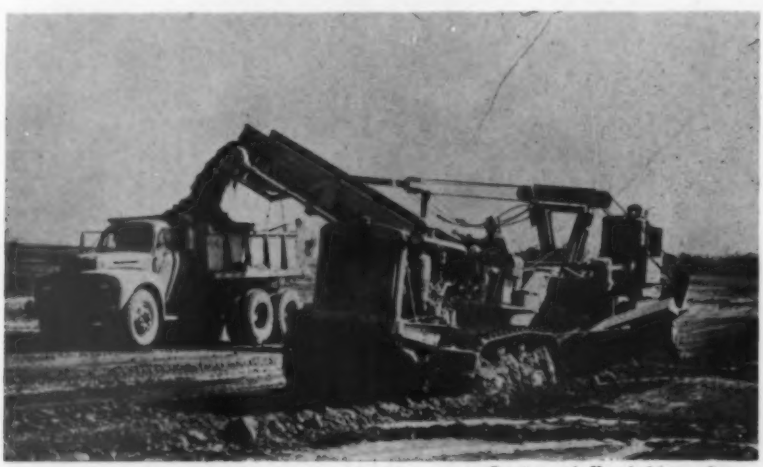
Courtesy of Link-Belt Speeder Corp.

Courtesy of Koehring Co.

Above: Loading rock with a power shovel.

Left: Operation of a crawler-mounted excavator with a dragline bucket.

Below: Operation of a loader teamed with a crawler tractor.



Courtesy of Harnischfeger Corp.

Lubrication

(*From page* 109.)

bushings through which oil seeps to the bearings.

Grease-lubricated pumps in which the grease does not come in contact with the engine coolant (*i.e.*, when the grease is applied to an external support bearing) should be lubricated with a general-purpose grease. Those in which the grease does come in contact with the engine coolant (*i.e.*, when the grease is used to lubricate the packing seal) should be lubricated with a heavy water-insoluble grease.

If cooling systems show signs of oil, it is an indication that either too much or the wrong kind of grease is being applied to the shaft.

Enclosed Gears In most cases the oil need not be changed more often than every 1,000 hours, although the oil level in the gear boxes should be checked every 50 hours. Check the drain plugs after heavy rain or severe dust conditions, then drain and refill if water is present or if dust is getting in. Keep the oil seals in good condition to prevent leakage. Going to a heavier grade of lubricant does not necessarily reduce leakage, since under heavy loads the heavier oil will result in an increase in the gear case temperature, which in turn will cause the lubricant to become less viscous. Foaming or overheating in gear boxes often indicates too high an oil level. This will also cause leakage. Keep vents open to prevent pressure build-up inside the gear case.

Open Gears Lubricants for open gears are of two types —those which must be heated and applied by brush or pouring and those which contain a solvent and are fluid at normal temperatures, thus permitting easy application. Shortly after application the solvent evaporates, leaving a thick viscous film of lubricant.

Gears should be inspected every 10 hours and more lubricant applied if necessary. Open gears operating in very dusty locations should be washed frequently with crankcase oil and no other lubricant should be applied. If gears must be run dry, reduce speeds and loads.

Grease Fittings Wipe fittings before and after applying grease. When the plug must be removed and a fitting applied, it is an indication that this part should be lubricated only occasionally. Most parts, such as plain bearings, should be lubricated frequently and freely by applying the

A diesel-powered crawler tractor with torque converter.

Courtesy of International Harvester Co.

product until clean grease shows at the point where the old grease is forced out.

Hydraulic Systems The pumps and valves of hydraulic systems are precision made, and a premium grade, inhibited oil should be used which will protect parts against wear, rust, and corrosion and which will have high resistance to foaming and the formation of gum and sludge. Gum and sludge formation may result in erratic motion and may eventually cause complete stoppage of the system.

Check the oil level frequently and keep it constant. This will prevent air from being drawn into the system, which could cause foaming. If foaming occurs or if the oil level is low, check the system for leaks.

Power Control Unit Operate the clutch firmly to prevent slippage, which results in overheating, hardening of leather oil seals, and leakage.

Rubber Parts Oils and greases may cause natural rubber and some synthetic rubbers to deteriorate. Keep tires, fan belts, rubber hose, engine mountings, rubber bushings on radius rods and spring shackles, and cooling system connections free from fuel, oil and grease.

Use only approved fluids in shock absorbers, brake cylinders, and hydraulic control systems containing rubber diaphragms, plungers, or seals.

Steering Gear Keep the gear housing filled with recommended oil to lubricate gear surfaces, bearings, and steering shaft. Use a low-pressure pump to prevent lubricant from being forced up the steering column.

Track Rollers Track rollers of crawler mechanisms having plain bearings require frequent lubrication to prevent dirt and water from working in. Those on shovels, draglines, and cranes should be lubricated every hour when traveling.

Caterpillar-Type Treads Do not lubricate. This refers to treads only and should not be confused with the track roller or idler assemblies. The pin between individual treads is designed to operate without lubrication. Dirt or other abrasives which could be picked up by the oil would act as a lapping compound and shorten the life of the track.

Turntable Roller Path Do not lubricate (except the double-flange type with hook roller). Lubricant will cause rollers to slide and wear flat. Lubricate bearings of turntable rollers sparingly to avoid drip on paths.

Universal Joints Some universal joints are provided with lubrication fittings. The ball-and-trunnion type should not be over-lubricated as the boot will become filled with lubricant. Some roller bearing types require disassembly and hand packing by an experienced mechanic.

The propeller shaft splines usually are equipped with a fitting. The type of plug or fitting should not be changed as the balance of the rotating part would be affected.

Wheel Bearings Front wheel bearings generally are lubricated by removing the wheels and repacking by hand.

Some rear wheel bearings have to be removed, while others are lubricated automatically from the differential or are permanently packed at the factory. Some are equipped with a grease cup or fitting, and still others have a plug which must be removed and a fitting substituted, the plug being replaced after the lubricant is applied.

Premature failure often is caused by contamination with dirt and dust during cleaning and repacking. Whenever wheel bearings are removed, they should be examined, washed carefully, and dried with air. After cleaning, grease should be packed around the bearings and the bearings replaced. Grease seals

(*Continued on page* 127.)

Because these rugged Back-Rippers break up the ground while the tractor is backing up — thus permitting the blade to make a **full** load **faster** on the forward trip — they give you **double advantage.**

Preco Back-Rippers make **every** dozing job easier — they pull out rocks and roots. Steep banks can be raked down quickly and road building is speeded up as the Rippers tear out boulders, ledge rock and hard material.

FOR . . . Building Pioneer Roads
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Mounted on Pusher Tractor for Faster Scraper Loading.

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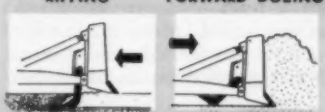

Preco Back-Rippers are completely automatic in operation — they dig in on the back-up trip and ride on the surface when going forward. There are no controls and, when desired, they can be locked up out of the way.

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A view of the Nelson Brothers portable plant near Reading, which is currently supplying asphalt aggregates for Broce Construction Company.

Kansas Turnpike

(*From page 77*)

of material in the asphaltic binder course, and 40,000 tons in the surface lift will have been used by the time this contract has been completed. The latter aggregates, which are processed through an Eagle Iron Works washer following reduction in the plant at Arkansas City, are delivered to a Barber-Greene 6,000-lb. asphalt batching plant erected near the turnpike route.

Operating on daily 11-hour shifts, this plant is producing about 1,900 t.p.h. of surfacing material. Along with the aggregate producing locations, the asphalt batching operations are under C. E. Nickel.

Payne & Dolan, Badger Materials A short distance northeast of Wichita, Badger Materials, Inc., of Chicago, co-contractors with Payne & Dolan, Inc., also carried out a core-drilling program last summer, as a result of which a tract of approximately 55 acres was leased. Most, if not all, of the contractors working limestone or sand and gravel deposits leased their tracts on a royalty basis.

At this location, the removal of about 5 ft. of overburden exposed a 5½- to 6-ft. medium-bedded limestone. Pit operations are carried out with a 2½-cu. yd. Northwest 80 D shovel that loads blasted rock into 15-ton end-dump Euclid trucks for a short haul to the crushing plant. The primary crusher, a 4256 Pioneer stationary unit, reduces the pit run material for feed to a following Pioneer 3654 double-roll secondary crusher, and a Cedarapids Commander portable plant.

A scalper between the primary and secondary crushers allows minus 1½-in. material to pass to the Commander, while the oversize is dropped to the secondary for further reduction and then fed to the portable screening plant. No trouble was encountered with fines in processing this stone, of which about 468,000 tons was supplied for the two base courses in the 9.9-mile contract.

Under the direction of G. Knudtson, superintendent, the plant, which was set up last October, averaged about 250 t.p.h. in producing base course materials on a 12-hour shift. At present, two 10-hour shifts are used to expedite processing of asphalt aggregates in meeting the contract deadline. The latter aggregates, of which approximately 68,000 tons will have been produced, are transported to the nearby Hetherington & Berner asphalt plant operated by a Payne & Dolan crew. This 5000-lb. plant was set up in February and started production in May. Averaging 1,200 t.p.d., it is operated on a 10 to 12-hour shift.

Reno Construction George Myers In the vicinity of Aikman, the Reno Construction Company of Overland Park, Kans., started opening three locations late last fall. Core drilling back from an outcrop established that there was about 60 ft. of good stone available for the two main quarries, which are known as the Cameron and Benson locations.

At the former, only a thin overburden had to be removed, and about 8 ft. was stripped from the latter. A 40-ft. ledge is operated at the Cameron site, while at Benson stone is removed to a depth of about 25 ft. Equipment at both locations is identical with one exception—each has a portable Cedarapids 3645 double impeller Impact breaker primary, and a 4033 hammermill in the secondary plant; but at Benson, the presence of a small amount of excessive fines in the primary product led to the installation of an intermediate screen between the primary and secondary plants. At Cameron, the quality of product was such that virtually the entire product could be laid on the turnpike grade as produced.

In addition to the sub-base and base course materials produced at these two locations (about 285,000 tons at Cameron and 434,000 tons

Below: With this portable equipment in a quarry near Ottawa, Concrete Materials and Construction Company is producing asphalt aggregates for turnpike pavers. At upper left are washing and rail loading facilities.

At Eskridge, Concrete Materials installed this 1000-t.p.h. facility to furnish base course materials for several miles of the new highway.

at Benson), approximately 280,000 tons of aggregates were provided from the third location in which a sub-contracting operator, George Myers, Inc., had a Cedarapids 3042 portable primary, and a 4024 secondary plant installed.

Aggregates for the 250,000 tons of bituminous material on the 21 miles of this contract are obtained from the Melvern area where Reno has a crushing plant for that purpose. The bituminous mixing plant, a Cedarapids G60, located near Chelsea, is producing about 2,400 t.p.d. Under the direction of F. P. Thomas, superintendent, the crushed stone operations near Aikman have produced approximately 3,000 t.p.d. on 10-hour shifts.

McCarthy Improvement, Dillon Stone Near Matfield Green, in the Flint Hills area through which the central portion of the turnpike route is located, the McCarthy Improvement Company of Davenport, Iowa, and a sub-contractor, the Dillon Stone Company, have produced about 800,000 tons of limestone aggregates for 17 miles of the highway's base courses. The Dillon firm is a long-established crushed stone and agstone producer with a plant at Columbus Junction, Iowa.

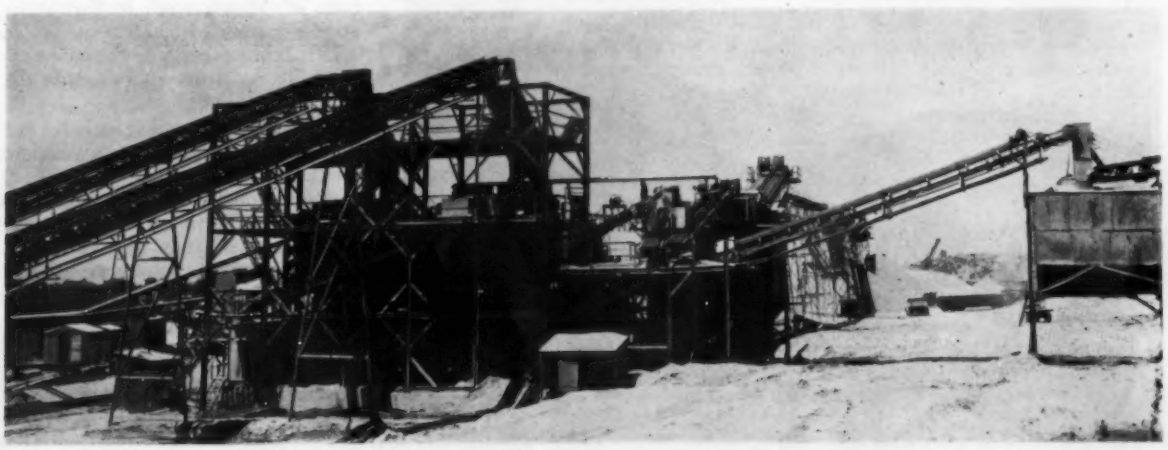
Following an exploration period of about a month, in which test holes were put down along nearly 14 miles of the turnpike route, the Dillon firm established a suitable location where about 30 ft. of acceptable stone was available for quarrying operations. After further test drilling on a close 10-ft. pattern, the quarry was opened in January of this year.

Shortly afterward, McCarthy also moved onto the site. Both operators employed Cedarapids 3042 double impeller impact breaker portable primaries and 4033 hammermill secondary plants. Fines created in the processing—about 20 percent in the range from 10-mesh down — have been discarded, by using an intermediate screen on which the lower deck, 1/4-, 3/16-in., etc., was varied as needed.

Superintended by William D. Dillon, project manager for the prime contractor, the plants have averaged a production of 180 t.p.h. on each of two 10-hour shifts during the period of laying base course materials. Since this stone does not meet the specifications for the aggregates in the asphaltic surfacing courses, the latter is obtained by McCarthy from the Ottawa area to supply the firm's model G60 Cedarapids bituminous plant located near Chelsea.

San Ore Just southeast of Emporia, the San Ore firm, whose operation at Arkansas City was described above, established another sand and gravel plant to supply aggregates for base courses on 9.5 miles in that area, plus those required for concrete in the Emporia interchange and bridge. A period of about one month was spent in exploration prior to bidding on the contract. Core drilling revealed a good deposit in an old valley bottom with

The previously established stationary operation of Concrete Materials at Moline has supplied a large tonnage of asphaltic concrete aggregates used on southern sections.



Portland cement concrete paving contractors in the eastern section of the project were supplied in part by this 3-unit portable operation of B. L. Anderson, Inc., near Lawrence.

an overburden ranging between 14 and 20 ft. No problems were encountered with respect to gradation.

Although present operations are confined to production of asphalt aggregates to supply about 72,000 tons of that material for the bituminous plant, two Cedarapids screening and washing plants had previously been operated in the pit to furnish 500 000 tons of base course materials. These units, combined, produced 800 to 900 t.p.h. During the latter processing, about 40,000 tons of 1½- to 4-in. oversize material was scalped, and is now being crushed and fed along with stockpiled finished aggregates to the asphalt plant.

A pair of Symons standard cone crushers (3- and 4-ft.) in circuit with a screen are now producing 1- and 3/4-in. sizes for the mixing plant. The latter, a Barber-Greene model 848 continuous flow unit, has an output of about 1.600 t.p.d. of bituminous mix on a 12-hour shift.

According to R. Mauser, superintendent at this location, the deposit is estimated to contain as much as or more than has already been removed, and it is probable that the company will establish a commercial pit on the property.

Broce Construction, Nelson Bros. On a tract adjacent to that of San Ore near Emporia, Broce Construction Company of Dodge City also operated a portable sand and gravel plant which processed 300,000 tons of material as a part of the aggregates required on the 13.8 mile paving contract awarded the firm. The balance of the base course material, as well as the asphalt aggregate now processed for Broce's Cedarapids G60 bituminous mixing plant, has been acquired from a sub-contracting plant operated by Nelson Brothers near Reading.

At the latter location, the Nelson firm has processed 325,000 tons of sub-base and base course stone for the Broce contract, and is currently engaged in completing production of approximately 84,000 tons of material for the asphalt surfacing.

Operating on a 6-ft. ledge of limestone, a 2½-cu. yd. Osgood shovel loads out blasted rock for transport to the Cedarapids crushing and screening plants, comprised of a 3645 impact breaker primary, a pair of screens, and a hammermill secondary. Here again, fines resulting from the reduction of relatively soft stone are removed ahead of the secondary plant by incorporating an intermediate screen. An average of 3000 t.p.d. has been realized at this operation in 10 to 12-hour shifts.

Concrete Materials Another operation established to supply turnpike materials is that of Concrete Materials and Construction Company, Cedar Rapids, Iowa, an established producer with 16 plants in Iowa and Kansas and with long experience in the provision of aggregates for such projects. Located near Eskridge, and about 10 miles west of the new highway route, this 1000-t.p.h. plant started production in March and is furnishing approximately 1,500,000 tons of crushed limestone to paving contractors with construction awards in the vicinity of Topeka.

Processing equipment includes one of the large Cedarapids impact breakers — a 5360H — for primary crushing, followed by four secondary units operating in parallel. The latter consists of four triple-deck vibrating screens, each in closed circuit with a 4033 hammermill. Normally, only two decks have been

Following grading of the right of way, this unit was employed in spraying hot asphalt on the straw over newly-seeded areas, as a protection against weather and erosion.

used—a 3-in. opening screen on the upper deck to relieve the 1½-in. opening lower screen. Oversize from both is returned to the hammermills and then rescreened, while the minus 1½-in. material is conveyed to stockpiles of base course materials.

Three reclaiming tunnel conveyors have been used to provide direct truck loading at the rate of 1,000 t.p.h. A 3-cu. yd. 175A Michigan front-end loader and a Caterpillar D6 Traxcavator are also employed in loading from stockpile. Truck shipments are weighed out over a pair of Fairbanks-Morse 30-ton truck scales.

Leaders among those plants supplying the turnpike's asphalt pavers with aggregates for the bituminous mix, are two other operations of Concrete Materials and Construction Company. Last fall this firm carried out a core-drill reconnaisance near an old quarry operation at Ottawa, and on the basis of information so gathered initiated quarry operations in November on a tract adjoining the mainline of the Missouri Pacific Railroad.

After setting up a Cedarapids 3645 impact breaker portable primary, a 4033 hammermill secondary plant, and a screen in conjunction with a McLanahan twin log washer, the crew started crushing operations early in March. For the last six months, this equipment has been producing at the rate of about 200 t.p.h. with the bulk of the product (190,000 tons) shipped by rail to three of the asphalt paving contractors.

In the quarry a pair of Link-Belt Speeders alternate in loading directly into the hopper of the portable primary crushing plant. From the secondary portable plant, minus 3/4-in. material is hauled to the washing plant located near the rail loading point. At this facility the fines (about 20 percent of the product) are removed in the log washer, following preliminary screening, prior to loading for shipment.

Although primarily engaged at present with the production of material for use on the turnpike, this plant, operated under the direction of R. Wolfersberger, superintendent, may become a permanent location for Concrete Materials.

At Moline, an older, established quarry operated by this firm (see PIT AND QUARRY, Jan., 1955, p. 149) has supplied Peter Kiewit & Sons Company with asphalt aggregate for the latter's bituminous mixing plant near South Haven. This quarry is also equipped with a Cedarapids 5360H impact breaker.

None of the four contractors engaged in the portland cement concrete paving operations on the 55-mile eastern section of the turnpike produced their own aggregates for base course and slab, but were supplied with these materials by several commercial operations including Loring Quarries, Bonner Springs; Tobin Quarries, Kansas City, Mo.; and Thompson-Strauss Quarries, Kansas City, Kans.

A new quarry operation was also established by the B. L. Anderson, Inc., firm near Lawrence to furnish concrete aggregates, sub-base, and shoulder materials for a 16-mile section of the rigid pavement. Three portable crushing-and-screening plants were put into production in March to supply a total of 800,000 tons.

B. L. Anderson Quarry-run blasted rock is loaded directly into the hopper of each of the three portable Cedarapids primary crushers by 3/4-cu. yd. diesel shovels. For production of base course stone, a 3645 breaker is used, followed by a 4033 hammermill and secondary plant. Concrete aggregates are produced with dual setups consisting of two 2036 jaw crushers, each followed by a 4033 hammermill and screens. Facilities installed to wash the latter type of aggregates include a Wash-All plant, a double log washer, a single screw classifier, and rinsing screens.

To meet the deadline for the primary contractors' paving contracts, these portable units have been operated on two daily 9-hour shifts with an output of about 2,500 t.p.d. of washed aggregate, and 3,500 t.p.d. of base course material.

Indicative of the co-operative spirit shown by the above operators and the other firms engaged in the construction of this project—an attitude which is not too common in such a highly competitive field—is the fact that despite pressure of deadline and strict specifications all have made an obviously successful effort to assure opening the turnpike on schedule—just 22 months after the first contract was let. In many instances, contractors who had completed a particular segment of their job on or ahead of schedule aided adjoining operations that had encountered difficulty by offering men, equipment, and materials, as necessary.

The routing of the turnpike provided a situation that had widely different effects on two groups of contractors. Due to a rather strong difference in climatic conditions that usually prevails in the northeastern part of the state as opposed to htat south of an east-west line below the Topeka area, the pavers in the north were frequently delayed because of rain. However, those in the southern section who not only lost little construction time, but were also able to do a part of their work during the winter months were plagued by the lack of water—an item which each contractor had to furnish and add in controlled quantities to achieve specified moisture content in the base courses.

MATERIALS

In addition to the more than 12,000,000 tons of sub-base and base course materials, shoulder material, asphaltic and portland cement concrete aggregates needed by the project—a figure higher than the combined production of all producers in many states—substantial quantities of other materials were required, including: 785,000 bbl. of portland cement, more than 26,500,000 gal. of bituminous materials, over 3,800 tons of steel mesh, and about six miles of 6-in. metal pipe. The right of way, which generally involves a 300-ft. strip throughout the length of the turnpike, will include, at completion of fencing for the entire project, more than 10,000 acres of land.

SAFETY, LANDSCAPING

Top consideration in the design of this super-highway was given to safety for the traveling public. Already mentioned is the depressed 20-ft. median which, in dropping at the mid-point to 2 ft. below the adjoining pavement, will retard any vehicle crossing the median out of control. Limited access is probably the most significant single safety feature, and other factors include the provisions of a maximum curvature of 3 degrees and maximum grade of 3 percent.

The latter presented a problem at several points where the route passed through cuts that would be of interest to many pit and quarry operators engaged in reclamation and rehabilitation of depleted areas. Owing to the fact that the establishing of specified grade often resulted in steep slopes, relative to heavy cuts or fills, the job of landscaping the right of way was not simple.

Depending on soils encountered, seed mixtures of smooth brome, western wheat grass, orchard grass, and others were spread at the rate of 40 lb. per acre along with 200 lb. of fertilizer. The problem of holding the seed and young grass on the steep slopes was solved by L. W.

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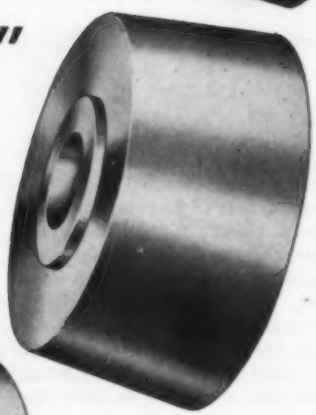

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F-C HARD EDGE STEEL CASTINGS	ELEVATOR, CONVEYOR PARTS Sprockets, Traction Wheels, Chains, Buckets, Rollers, Idlers, Bushings.	CRANE WHEELS Overhead, Gantry, Monorail, Ingot Car, Charging Machine.	HEAVY HARDWARE Complete Line Wire Rope Fittings and Cutters, Bar Benders and Cutters.
F85 STEEL CASTINGS			

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SANDUSKY, OHIO

Newcomer, office and contract engineer on the authority staff. Mr. Newcomer's solution, an innovation in this regard, involved the use of hot asphalt in lieu of an asphaltic emulsion to anchor straw over seeded surfaces. After spreading straw with a blower, an asphalt truck equipped with a special extendable spray bar was employed to apply the hot mix. The method was quite successful in combatting erosion and gullying, and grass had no difficulty in coming up through the layer.

REVENUES, TAXES

Despite the fact that the investors who provided financing for the $160,000,000 program hold a "lien" on the title to the turnpike, the people of Kansas are the actual owners. During the estimated 19 to 21 years required to pay off the investment, only tolls and revenues over and above the cost of operation, maintenance, repairs, and reserves for such purposes will be deposited in a sinking fund.

Significantly, the new turnpike while directly serving a limited number of points along its route, will benefit the entire state. Turnpike traffic will, through payment of gasoline taxes on each gallon acquired from service stations on the route, help the highway program in the rest of the state. This tax money is not used on the turnpike, but goes into the state fund for Kansas highways.

Among the Kansas Turnpike Authority officials who have devoted their efforts to the completion of this link in the planned national network of super-highways are Francis Jacobs, chairman; W. A. Rugan, vice-chairman; Senator E. B. Collard, secretary-treasurer; Representative L. J. Blythe; J. Blake; A. Hodnett, and T. J. Griffith.

The authority's administrative staff is headed by Gale Moss, general manager; L. W. Newcomer, office and contract engineer; J. A. Campbell, right of way engineer; Don E. Symes, comptroller; and C. L. Stroup, director of public relations.

CHARLES LESLIE HAUGH has been named assistant district sales manager of the Ruberoid Company's New York district. Mr. Haugh will make his headquarters at the company's offices in South Bound Brook, N. J. He joined Ruberoid in 1955.

JOHN W. ROCKWOOD has been named to succeed F. J. Collins as the new manager of the Kelley Island Division of Basic, Inc., formerly Basic Refractories Company.

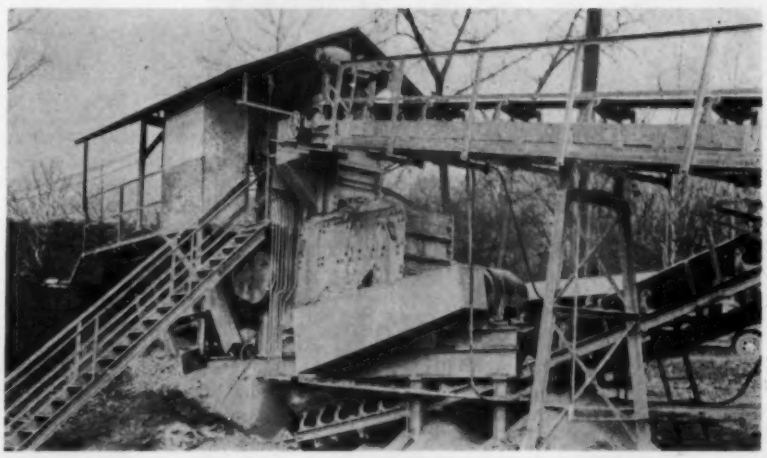
Hydraulic-Press Brick Raises Haydite Output At Rebuilt Ohio Plant

WHEN Hydraulic-Press Brick Company recently rebuilt and enlarged its Haydite production plant at South Park, a suburb of Cleveland, Ohio, the firm—which is reportedly the fourth company in the world to undertake manufacture of this material and is therefore a pioneer in the field—nearly doubled its former output with this facility in attaining the present 500-cu. yd. daily capacity.

Formed as a brick manufacturing firm at St. Louis, Mo., in 1868, the company subsequently opened a brick plant in Ohio in 1893. Production of Haydite expanded aggregate was initiated in 1928 at St. Louis, and later in that year, at Cleveland. Subsequently, all effort was devoted to the new product at the South Park location, and the brick plant was dismantled. An average daily output of about 280 cu. yd. was realized with the original Ohio Haydite plant during the years between 1928 and 1955.

Operating components and facilities for the rebuilt facility include a raw shale cuber, screens, a raw shale storage silo, a kiln, a conveying system, and crushing equipment. It was established during the company's 27-year experience with the original plant that open-type motors were easier to cool and gave very acceptable service for the conditions under which they were operating. On that basis, open-type induction models ranging in capacity from .5 to 150 hp. were installed on virtually every piece of equipment. The greater number of these units are of Fairbanks-Morse manufacture.

The first step in processing expanded aggregate at the South Park plant involves cubing and primary screening. Raw shale is trucked from the pit and dumped into a hopper at the plant site. An apron feeder transports the material from the hopper to the raw shale cuber—a Kennedy Van Saun unit driven by a 150-hp. motor operating at 1,200 r.p.m. Cuber discharge is conveyed to the primary screen from which throughs of desired top size are transported on a belt conveyor to the storage silos. Oversize is returned to the cuber.



Pit-run shale is processed through the cuber (center) before primary screening and transport to the storage silos at the Hydraulic-Press Brick plant.

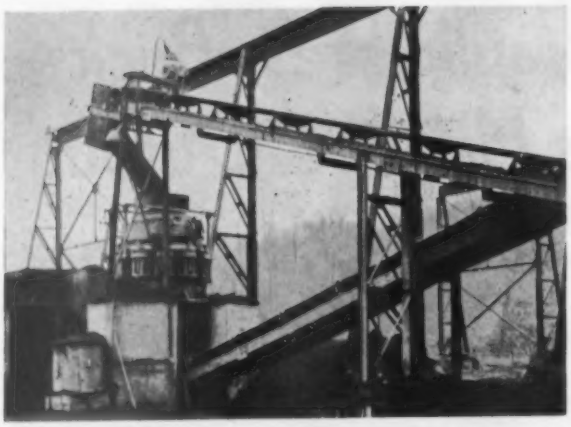
In feeding the kiln, screened raw material is transported from the storage silos on a belt conveyor driven by the same 50-hp. design motor that furnishes power for the kiln. The latter is operated at 1 r.p.m., with drive from the dual-purpose motor furnished through a speed reducer.

To accomplish the expansion of the materials in bringing them to a state of incipient fusion, kiln temperatures are maintained somewhat in excess of 2,200 deg. F. Coal used in firing is processed through a ball mill driven by a 40-hp. motor. This pulverized fuel is then fed to the kiln by a suction fan on which a 15-hp. 1,200-rp.m. motor is installed. Efficient combustion is assured by an induced draft provided with a fan driven at 900 r.p.m. by a 75-hp. motor.

Expanded aggregates discharged from the kiln are cooled in an adjacent area provided for that purpose. After cooling, the un-sized materials are transported to the finishing plant for final processing, which involves a dry pan, a secondary cone crusher, and screens. The "clinker" is first fed to the dry pan, which is equipped with a 50-hp. motor, and then to a 4-ft. Symons Short Head cone crusher, after which the reduced material is fed to a battery of screens for final grading.

The 500-cu. yd. daily output of

An overall view of Hydraulic-Press Brick's rebuilt and enlarged expanded shale plant near Cleveland, Ohio.



Final reduction for finished products is accomplished in this 4-ft. cone crusher.

Haydite expanded aggregate by Hydraulic-Press Brick's South Park facility has found many uses, including structural and insulating concrete, precast concrete products, open-hearth furnace and boiler walls, and jet engine test cells. The background of applications of this material since its inception about 40 years ago reflects the technological advances made since that time. Expanded aggregates have come a long way way from one of their first uses in the reinforced concrete construction of a World War I tanker to that when it was recently involved in the Yucca Flats test of atomic explosion effects on typical housing structures.

In the latter test, the two houses constructed of reinforced concrete containing expanded aggregate not only withstood the explosion at 4,700 ft., while other buildings of wood and brick veneer were virtually destroyed, but it was also learned that the expanded aggregate concrete provided protection from deadly radioactive fallout.

Woodward-Pollock Plant Solves Aggregate Problem

After several months of preparation and planning the Woodward-Pollock sand and gravel plant near Coldwater, Mich., was opened recently to process material for the firm's transit-mix concrete.

Officials of the company decided to develop their own supply when they were faced with a shortage of high-quality sand and gravel for the concrete operation last year. To recover the material the firm purchased a big barge which had been used by the Wolverine Portland Cement Company to haul marl to its plant. Now anchored at the plant site, the barge supports a diesel engine and pumping equipment.

800 Korean Cement Workers To Live in Brand New Village

An entirely new village will be added to the map of Korea in the near future with the completion of the settlement of Kyongsang Pukdo. This community will be the result of a project of the U.N. Korean Reconstruciton Agency, which is building homes for the employees of the Mungyonh cement plant on land formerly used for rice fields.

The village will have housing facilities for about 800 persons, a community center, and an elementary school — all provided at a cost of approximately $8,500,000. U.N.K.R.A. is providing imported building materials and electric, water, and sewage systems.

● J. C. Kingsbury who was recently elected president of the Perlite Institute at the organization's seventh annual meeting. (See Pit and Quarry, August, page 12.) Mr. Kingsbury succeeds Lewis Lloyd, who retired after a two-year term.

Wiley Assumes A.R.B.A. Post In Materials-Supply Div.

John E. Wiley, who was formerly assistant executive secretary of the American Association of State Highway Officials, was recently appointed managing director of the Materials and Supplies Division of the American Road Builders' Association.

Mr. Wiley served in his previous post for six years, and was also editor of *American Highways*, official publication of A.R.B.A. Prior to that assignment he was associated with the Wyoming State Highway Department in various capacities. With the exception of a 10-year period spent in the armed forces during World War II, Mr. Wiley had been with the Wyoming Highway Department from 1927 until he went to Washington, D. C., to assume his duties on the staff of the American Association of State Highway Officials.

John E. Wiley

In his new position with A.R.B.A. he will be working to anticipate "soft spots" in the production and supply of materials used in highway construction. His appointment marks the beginning of a plan set up by A.R.B.A. to encourage technical materials research and standardization.

HARRY LE GORE, who has headed the Le Gore Lime Company at Le Gore, Md., for many years, died recently after an extended illness. In his college days at Yale University Mr. Le Gore was selected by Walter Camp as an all-American halfback. He was an active member of the National Lime Association.

Penn Dixie Cement Corporation, New York, N. Y., recently assumed ownership of the Medusa Portland Cement Company's silos at Holland, Mich.

Gulf Quality Lubricants and Fuels
contribute to economical equipment operation
at Alabama Aggregate Company

(Below) Part of the fleet of hauling units operated by the Alabama Aggregate Company, Fortson, Ga. (Right) R. E. McWaters, Superintendent, shows Gulf Sales Engineer Charles J. Cason, Jr., a connecting rod from the engine of the diesel electric set that provides electric power for the plant. Recently disassembled for inspection, all parts of this engine were found to be in excellent condition after over 7000 hours of continuous operation with Gulf Super-Duty Motor Oil.

Ask the Alabama Aggregate people—and many other progressive organizations in the industry—why they prefer Gulf products, and you'll probably get an answer something like this: "Gulf lubricants provide an extra margin of protection for equipment, keep maintenance costs at rock bottom levels. Gulf fuels help us to get top engine performance because they burn evenly and completely. And Gulf's cooperative engineering service helps us select just the right fuels and lubricants for every piece of equipment."

The chances are your operation can also benefit from Gulf quality products and helpful service. Consult the telephone directory for the number of your nearest Gulf office, and ask a Gulf Sales Engineer to call.

Gulf Oil Corporation • Gulf Refining Company
1822 Gulf Building, Pittsburgh 30, Pa.

GULF

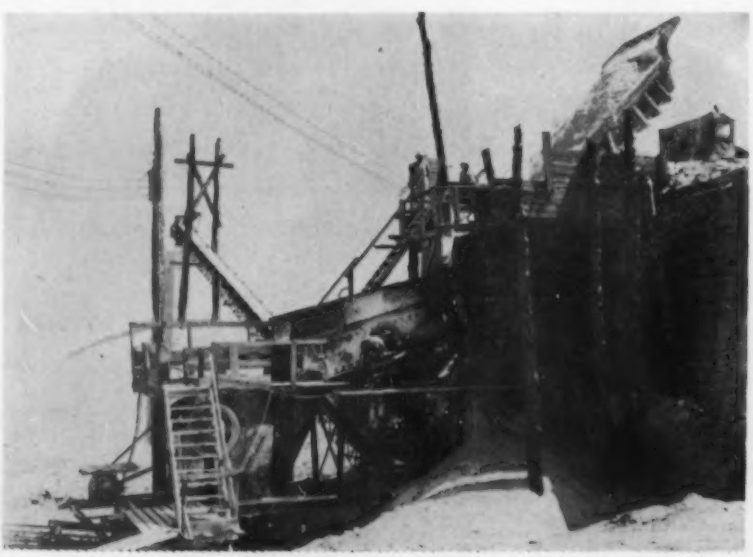
THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

Scarce Concrete Aggregates

produced at new plant in northern Florida

By WALTER E. TRAUFFER

The 1¼-cu. yd. diesel shovel in the quarry of the Live Oak (Fla.) Stone Co. loading to one of four 15-ton heavy-duty dump trucks. The plant is operated by the Porter Brown Limestone Company of Springfield, Tenn.



In the original flowsheet the trucks dumped to the pan feeder to the scalping screen ahead of the jaw crusher. Now the feed is direct to the crusher, or sometimes bypassing it.

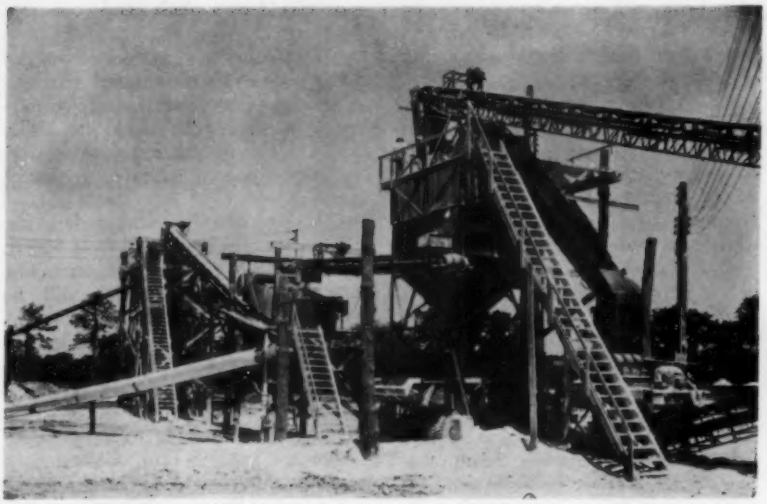
Another ON THE SPOT Report

THERE are in this country a number of areas where deposits of hard and sound concrete aggregates are scarce, with the result that such materials must be imported from distant and more fortunate sources. North Florida and southern Georgia form one of the largest such areas, and some large consuming centers such as Jacksonville must import their coarse concrete aggregates from sources 200 to 400 miles away.

It was in searching for a deposit which would make such material more economically available to this area that Robert B. Shepard and Daniel Blake located one about a mile north of Live Oak, Fla. Tests having proved an ample supply of good material, it was decided to develop the deposit and build a crushing and screening plant. The Live Oak Stone Company was formed as the sales agent, with Mr. Shepard as president and Mr. Blake as vice-president and sales manager. Porter Brown Limestone Co., well known crushed stone producers of Springfield, Tenn., was induced to undertake the production of this material.

The deposit is Suwannee limestone, a hard limerock similar to that found near Brooksville, Fla.; it has a soft lime coating which washes off readily. The real problem is created by clay balls which are separate from the rock but which are plastic and difficult to break down. It was decided to build a basic experimental plant first which could readily be altered or added to as necessary to process this material.

The original plant layout, showing the sizing screen, the hammermill, the screw washer, and the rinsing screen.

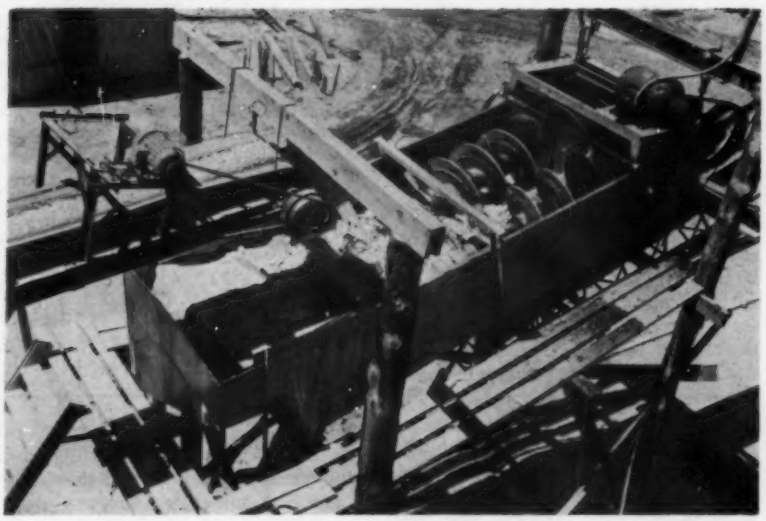


Construction of this plant was begun in September, 1955, and crushing was begun late in November. This article describes the plant as it was when visited early in 1956. It was then producing about 150 t.p.h. of road base material, and it was planned to add a log washer and/or a rotary scrubber in order to produce a suitable concrete aggregate. During April, 1956, changes in the flow were made based on the experience to date; these changes are also described.

The quarry was developed from one which had been worked on a small scale by other parties. The overburden, sand and earth, is removed by the quarry shovel during off seasons or when heavy rains make it impossible to work in the quarry. Drilling is done with a 4-in. Joy wagon drill using Ingersoll-Rand detachable bits. Air is provided by an Ingersoll-Rand 600 rotary compressor. The sticky nature of the material makes drilling and blasting a problem; so the depth of holes is held to a maximum of 14 ft. Usually three rows of five holes each, spaced 12 by 12 ft., are fired at one time. Dupont 40 percent explosive in 3-in. sticks is used, with 1½ to 2 sticks in the bottom of each hole. This does not blast out the material but breaks it loose and shakes it up so that it can be dug by the shovel. Electric caps are used, with no delays.

The Northwest Model 6 shovel has a 1¼-cu. yd. dipper and a Murphy diesel engine. It loads the stone into four Euclid 15-ton dump trucks which haul about 2,000 ft. to the plant. There they discharged onto a 4- by 14-ft. Cedarapids pan feeder ahead of a 5- by 14-ft. Pioneer 2-deck scalping screen which had 4-in. and ½-in. openings on its top and bottom decks, respectively. The minus ½-in. material through the bottom deck was waste material and included much of the clay. A 24-in. by 100-ft. inclined belt conveyor discharged this material to a waste pile from which it was rehandled by a Caterpillar D7 bulldozer. This material may be reprocessed later as fine concrete stone.

The ½- to 4-in. rock off the bottom deck of the screen bypassed the primary crusher onto the 36-in. by 160-ft. main belt conveyor. The



The 36-in. by 18-ft. twin screw washer on which some of the screw flights had been replaced with log washer paddles.

A view from the other end of the original plant shows the rinsing screen and the waste water pipes.

plus 4-in. rock went to the 30- by 42-in. Pioneer jaw crusher which was set at 4-in. maximum opening and was V-belt driven by a 100-hp. motor. The impact of the crusher product on the belt conveyor was cushioned by the finer material. The conveyor discharged onto a 4- by 12-ft. Cedarapids 2-deck screen with 1- and ⅜-in. openings. Oversize went to a Cedarapids 4033 hammermill and was returned by a short belt conveyor to the main conveyor, forming a closed circuit. The hammermill was driven through V-belts by two 75-hp. motors.

The minus ⅜-in. material through the bottom deck of this screen was road base material and was chuted into a 45-cu. yd. Pioneer 2-compartment truck loading bin.

The 1- to ⅜-in. intermediate size from this screen was carried on a 30-in. by 35-ft. conveyor, supported on a channel iron framework, to a 36-in. by 18-ft. Eagle twin-screw washer. Just past the feed end some of the screw flights had been replaced with log washer paddles—8 on each screw—to help break up any remaining clay. The washer was V-belt driven by a 50-hp. motor.

The product of the washer was carried on a 30-in. by a 60-ft. belt conveyor to the final screen—a 4- by 14-ft. Cedarapids 2-deck unit. This was equipped with sprays and was then used only for rinsing. The washed 1- to ⅜-in. concrete rock was discharged into a 45-cu. yd. truck-loading bin.

In the revised flowsheet adopted in April the material from the quarry is now discharged either through or back of the jaw crusher, and the entire feed goes to a 6- by 24-ft. Cedarapids rotary scrubber. This discharges onto a 4- by 14-ft. Cedarapids 3-deck screen, which dewaters the scrubbed material. The clay and wash water pass through the No. 8 bottom deck of this screen.

As the amount of fines in the feed to the scrubber have a tendency to cushion the grinding action, a 36-in. by 30-ft. Eagle twin log washer has been ordered and will be placed in the circuit parallel to the scrubber. It will discharge to the same dewatering screen as the scrubber. The dewatered material is then discharged on the original 36-in. by 160-ft. main belt conveyor to the 4- by 12-ft. Cedarapids 2-deck sizing screen.

The fines from the log washer, the scrubber, and the screw washer are now taken to a new 30-in. by 25-ft. Eagle fine material screw which produces about 50 t.p.h. of minus ⅛-in. material for asphalt and concrete block use.

The minus No. 4 material from the sizing screen is dewatered through a smaller Eagle screw and is marketed for concrete block use. The plant is also producing various sizes of concrete and surface treatment aggregate.

The next change to be made in the plant is the construction of a 300-ft. long stockpile reclaiming tunnel. The various sizes of material will be stockpiled by individual belt conveyors from the sizing screen. The 36-in. reclaiming belt conveyor will feed to a 5- by 14-ft. rinsing screen, and the rinsed material will go to a bin for truck loading or to a belt conveyor for loading into railroad cars.

Rail shipments are made *via* a spur line to the three major railroads serving this area. Truck shipments are weighed on a Howe truck scale.

Wash water for this plant is obtained from a 300-ft. well by a Peerless 1200-g.p.m. pump and discharges into an artificial pond which will be filled up for reserve storage for dry seasons. The plant is supplied from this pond at the rate of 1000 g.p.m. by a Dayton-Dowd 8- by 6-in. centrifugal pump driven by a 100-hp. motor. Waste water from the plant goes to a series of settling ponds which have been formed near the plant and finally flows by gravity back into the feed pond. Some of the fines settled out are sold.

Caterpillar Holds Party On D9's First Birthday

At a trade press information conference recently held by Caterpillar Tractor Company for editors and representatives of trade and farm publications, the firm celebrated the first "birthday" of the introduction of its model D9 tractor.

A reproduction, in cake, of the large new tractor is cut by Caterpillar's vice-president in charge of engineering, G. E. Burks. At his left is Jerry Cook, news editor.

The trade press guests at the "birthday" party were taken on a tour of Caterpillar's Peoria facility where they were shown operations on the D9 assembly line. In addition they were given the opportunity to operate, under the guidance of Caterpillar personnel, the D9, D8, and other equipment being exhibited.

Slight Increase Reported In April Sales of Lime

Domestic sales of open-market lime in April, 1956—808,273 short tons—increased slightly from the previous month's figure, according to reports made by producers to the U. S. Bureau of Mines. Increases were noted in agricultural and building lime and a slight decrease in the refractory and chemical uses.

The accompanying table shows sales by types and major uses.

Lime Sold by Producers[1] in the United States, in Specified Periods of 1955-56, by Types and Major Uses, in Short Tons

	March	April		January-April	
	1956	1956	1955	1956	1955
By types:					
Quicklime	630,343	644,973	597,978	2,516,132	2,251,967
Hydrated lime	161,821	163,300	178,858	615,685	602,016
Total lime[2]	792,164	808,273	776,836	3,131,817	2,853,983
By uses:					
Agricultural					
Quicklime	4,009	8,894	13,364	19,678	23,282
Hydrated lime	15,596	22,617	27,744	57,008	60,931
Total	19,605	31,511	41,108	76,686	84,213
Building:					
Quicklime	14,534	14,556	16,209	54,190	80,383
Hydrated lime	78,470	86,475	89,811	300,125	296,017
Total	93,004	101,031	106,020	354,315	376,400
Chemical and other industrial					
Quicklime	393,085	405,991	368,863	1,583,611	1,392,599
Hydrated lime	67,755	54,208	61,303	258,552	245,068
Total	460,840	460,199	430,166	1,842,163	1,637,667
Refractory (dead-burned dolomite)	218,715	215,532	199,542	858,653	755,703

[1]Also includes a small quantity of captive tonnage. The monthly canvass excludes the output of plants producing less than 10,000 tons a year.
[2]Approximately 60 percent of lime produced is high calcium and 40 percent high magnesium.

Lubrication

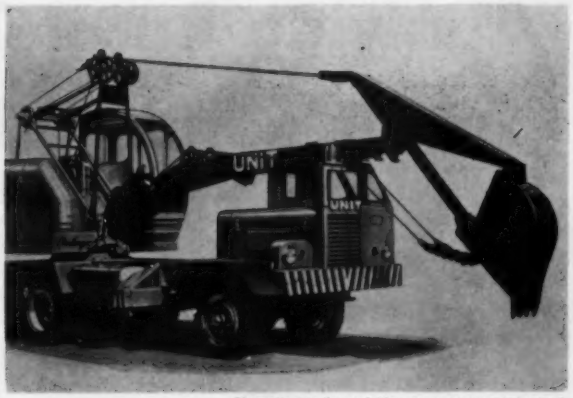
(*From page* 115.)

should be examined carefully and replaced if necessary. Ball bearings must be adjusted so that the wheel will turn freely with no end play. Only a small amount of additional grease should be placed in the bearing housing as over-lubrication may result in grease on the brakes.

SUMMARY

Investments in heavy construction equipment and expenditures for construction projects are at an all time high and are expected to increase still further during the next few years. Over 20 percent of the total sum spent on construction operations is devoted to keeping equipment operating, but less than 1 percent of the total is spent on lubricants. In view of the recognized importance of proper lubrication to the performance and life of the machinery and the relatively low amount spent for lubricants, it is self-evident that compromising with lubricant quality is false economy.

Operating costs can be reduced to the minimum and equipment life can be extended by: (1) adopting a simplified lubrication plan which will keep the number of lubricants on the job to the minimum but will still satisfy fully all of the lubrication requirements; (2) storing and handling lubricants properly, so that changes of contamination will be minimized; and (3) establishing a preventive maintenance program which includes periodic mechanical and lubricant check-up and following it to the letter.



An excavator equipped with a trenchoe boom.

Courtesy of Unit Crane and Shovel Corp.

A.S.T.M. Meeting

(*From page* 104.)

of wide interest and was entertaining as well as inspiring and informative.

New Officers, Directors The newly-elected officers of the society are as follows: president, Rudolph A. Schatzel, vice-president and director of engineering, Rome Cable Corporation, Rome, N. Y.; vice-president, Kenneth B. Woods, head of the School of Engineering and director of the Joint Highway Research Project, Purdue University. Directors include Miles N. Clair, president, the Thompson & Lichtner Company, Inc., Brookline, Mass.; Howard C. Cross, assistant technical co-ordination director, Battelle Memorial Institute, Columbus, Ohio; George H. Harnden, consultant, materials and processes, Engineering Standards Service, General Electric Company, Schenectady, N. Y.; R. R. Litehiser, engineer of tests, State Highway Testing Laboratory, Columbus, Ohio; and Charles R. Stock, senior group leader, Physical Measurements Laboratories, American Cyanamid Company, Stamford, Conn.

Throughout the meeting members from California popped up continuously to promote attendance at the second Pacific Coast Conference to be held at the Statler Hotel in Los Angeles, September 16 through 22, 1956. Judging from the conversations overheard among those who attended the 59th annual meeting in Atlantic City, the West Coast national meeting should prove to be the most successful held by the society west of the Mississippi River.

Corrosion Proofing Manual Issued in Revised Edition

A revised edition of Pennsalt Chemicals' reference manual on corrosion proofing provides information on the latest developments in this field. Included are descriptions of the application of Corlok, an entirely new type chemical-resisting mortar recently introduced by Pennsalt. Corlok is a special silicate bonding material which is resistant to sulfation and highly concentrated acids at temperatures up to 1,900 deg. F. for long periods of time.

Tables and charts cover specific applications of corrsoion - proofing materials.

The brochure is free on request from Corrosion Engineering Dept., Pennsalt Chemicals, 3 Penn Center Plaza, Philadelphia 2, Pa.

Correction

• We regret that the feeders mentioned in our description of the United States Gypsum Company's New Braunfels, Tex., plant (June issue, pp. 108, 109) were erroneously identified as Syntron units; they are made by the Jeffrey Mfg. Co.

• In the Lehigh Portland Cement Company's quarry at Iola, Kans., this International Model 55 Payscraper recently replaced two crawler tractors and a 10-cu. yd. scraper. Working part time at stripping overburden from limestone deposits, the self-loading Payscraper is able to keep well ahead of the quarry crew on a 1,200-cu. yd. haul. The unit is also utilized to move coal from the stockpile to charging sheds.

Applying Rural Zoning Principles To the Sand and Gravel Industry

By RICHARD E. HOLE
Spidel, Staley & Hole
Greenville, Ohio

I HAVE been asked to appear before this group* to speak to you concerning the subject of group zoning. I am most happy to be here as the subject is one in which I have a great interest. About ten years ago, the opportunity was afforded me to return to the law school of the University of Michigan, where I conducted considerable research into this subject, especially as it might affect the sand and gravel industry.

Representing clients plagued with this problem has kept me informed currently as to the legislation and judicial decisions in Ohio bearing upon this matter.

Actually, rural zoning has a relatively recent history. The first state that enacted a statute on the subject was Wisconsin in the year 1929. Prior to that time in the United States zoning was confined solely to urban zoning. In order to enable you to get some insight into the question of rural zoning, I should like first to consider briefly the matter of urban zoning. The first attempts at municipal zoning met with a great deal of opposition, and many constitutional lawyers seriously doubted the legality of such laws. The legal basis upon which zoning laws rested was the police power, that nebulous concept under which laws are upheld which are in furtherance of the public safety, healthy, morals, general welfare, and prosperity of the body politic.

It might be well at this point to make it clear emphatically that zoning laws are not based upon the regulation of nuisances. As a matter of fact, a zoning law may permit a use which is a nuisance and prohibit a use which is not a nuisance. Within the last year the courts of appeals in Medina and Summit (Ohio) counties have upheld zoning resolutions which have prohibited the establishment of trailer camps in the township. Of course, the maintenance of such camps is not a nuisance, *per se;* but despite this fact the courts are sustaining such legislation. Whether such a prohibition against the operation of a sand and gravel plant would be constitutional has never been decided. I seriously doubt that a court would uphold such a resolution, as there is a definite distinction between a mining operation and other types of enterprises which I shall subsequently point out.

As above stated, many lawyers doubted the constitutionality of zoning laws, arguing that the non-compensating police power could not be resorted to in order to control the use of property. Such opponents of zoning claimed that the laws violated the 5th and 14th amendments to the United States Constitution, the first of which provides in part: "nor shall private property be taken for public use without just compensation." The second (amendment mentioned) provides in part: "nor shall any state deprive any person of life, liberty, or property, without due process of law; nor deny to any person within its jurisdiction the equal protection of the laws."

They also argued that zoning laws violated such provisions of state constitutions as are embodied in Article I, Section 1 of the Ohio Constitution as follows:

"All men are, by nature, free and independent, and have certain inalienable rights, among which are those of enjoying and defending life and liberty, acquiring, possessing, and protecting property, and seeking and obtaining happiness and safety."

Also cited was Article I, Section 19 of the Ohio Constitution as follows: "Private property shall ever be held inviolate, but subservient to the public welfare . . ."

Despite such contentions, zoning ordinances were adopted in many cities. The rapid expansion of municipalities with the resultant haphazard development of industrial and residential areas made it imperative that some governmental control and regulation be established. Naturally, litigation arose out of the enactment of such legislation. One such litigated case reached the Supreme Court of the United States, and in the now famous case of *Village of Euclid vs. Ambler Realty Company,* 272 U.S. 365, that court, with three judges dissenting, upheld the comprehensive zoning ordinance of the Village of Euclid, Ohio.

However, none of you nor your attorneys should jump at the unwarranted conclusion that by reason of this decision all comprehensive zoning ordinances are constitutional. A zoning ordinance to meet constitutional requirements (1) must not be unreasonable, arbitrary or capricious; (2) must bear a reasonable or substantial relation to the public health, safety, morals, welfare and prosperity.

In the *Ambler Realty case* the United States Supreme Court used the following language:

"It is true that when, if ever, the provisions set forth in the ordinance in tedious and minute detail come to be concretely applied to particular premises, including those of appellee, or to particular conditions, or to be considered in connection with specific complaints, some of them, or even many of them, may be found to be clearly arbitrary and unreasonable."

Consequently, it is quite evident that the court recognized that the ordinance as applied to varied factual situations might be unconstitutional and inoperative.

Now let us get down to our specific subject-matter, namely, rural zoning. In the year 1947 the Ohio Legislature adopted laws providing for zoning by the county commissioners in parts or all of the county, and by the township trustees in parts or all of the township. Such laws are commonly referred to as enabling statutes. In other words, the zoning does not become operative simply by virtrue of the state legislation, but only when the county or township officials have acted. Inasmuch as the procedure for the adoption of a zoning resolution in a county or in a township is practically identical, I shall confine my remarks to township zoning, and it can safely be assumed that the same are applicable to county zoning as well.

The legal machinery for establish-

*Presented at The Ohio Sand and Gravel Association meeting, Columbus, Ohio, April 25, 1956.

The Universal 293QS on a road construction site west of Tremonton, Utah, 1955.

The Universal 293QS TwinDual Gravel King has

"Increased our pay load by 33⅓%, lowered operating costs 10c per ton"

Says Jed R. Abbott of Germer, Abbott & Waldron Construction Company, Tremonton, Utah

Abbott's company saved $20,000 on its first large order for aggregate produced by the Universal 293QS.

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The 293QS is the most versatile machine on the market—two plants in one! Inquire how you can convert it quickly from gravel to crushed stone production and back again.

"On the Highway 91 job, it took three D-8 Cat dozers and a scraper to feed the 293QS. The plant we were using before required only one D-8. That'll give you an idea of the difference in capacity."

You'll have a story to be proud of, too, when you work with the Universal 293QS. Producers are enthusiastic about the ability of this plant to make up for lost time. As Jed Abbott puts it, "The severity of Utah weather could mean the loss of much production, but with the Universal 293QS we have the capacity to fill larger orders, fill them faster, charge less and make more money in the long run."

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ing zoning is set in motion by (1) the township trustees in passing a motion on their own initiative, or (2) on petition signed by 8 percent of the qualified electors residing in the territory to be included in the zoning plan. This 8 percent is based on the number of votes cast for all candidates for governor at the last general election.

The trustees then establish a zoning commission of five members residing in the affected territory. This commission is empowered to draw up a plan with appropriate texts and maps, and after so doing and before submitting its plan to the trustees, the commission is required to hold a public meeting.

The only notice required before the holding of such meeting is one publication in a newspaper of general circulation at least 30 days before the hearing. Naturally, such an item might escape the notice of an interested person. However, a word of caution to all of you: do not fail to attend such hearings and the subsequent meetings required by law. You should make your position known to the officials responsible for preparing and adopting the zoning resolution because you can rest assured that no one else is going to plead the cause of the sand and gravel producer. As a matter of policy, at the first indication of official action to establish zoning, it behooves all of you to contact the township trustees, and the appointed members of the township zoning commission for the purpose of giving them the benefit of your views with respect to zoning, and the proper classification of your industry.

After the township zoning commission acts, the tentative zoning resolution is submitted to the county or regional planning commission. Unless this county commission advises the township zoning commission to the contrary within a period of 20 days, it is conclusively presumed that the plan as submitted is approved. The county planning commission is empowered to disapprove the plan or recommend changes. If this is done, the township zoning commission is required to hold a second public hearing. It should be noted that the statute does not require a public hearing before the county planning commission; but despite this fact, it certainly is advisable to make your views known before the planning commission.

After the plan is in shape, it is forwarded by the township zoning commission to the township trustees, who are required to hold a public hearing on the plan after giving 30 days' notice by publication in a newspaper of general circulation.

Here again sand and gravel producers should be present to give the trustees the benefit of their opinions. While I can frankly and sadly say that in my own experience, I have not been too successful in getting changes and modifications in accordance with my clients' wishes, I still believe there is such a possibility. Everything should be done to see that the public officials at least have an opportunity to enact a resolution which will protect sand and gravel producers. If you don't furnish the information, no one else will.

After the township trustees have adopted the zoning resolution, they must submit to the electors residing in the territory affected the question as to whether or not the resolution shall be put into effect. If a majority voting on the issue approves, the zoning resolution becomes effective.

The enforcement of the zoning resolution is primarily in the hands of a board consisting of five members appointed by the township trustees; this board is called the Township Board of Zoning Appeals. In addition, there is a zoning inspector, who is empowered to issue zoning certificates to applicants who intend to make use of their land in accordance with the provisions of the zoning resolution. Appeals can be made made the decisions of the zoning inspector in granting or refusing to grant a certicate. Such appeals are to the Board of Zoning Appeals. Anyone dissatisfied with the decision of the Board of Zoning Appeals may appeal to the Common Pleas Court of the county.

At this point, I should like to make myself crystal clear as to the limitations on this right of appeal. The appeal from the Board of Zoning Appeals to the Common Pleas Court is on questions of *law only,* and in such cases the party appealing cannot try his case *de novo.* The Common Pleas Court only reviews the case on the record made before the Board of Zoning Appeals, and will not permit the introduction of any evidence before it. The practical effect of this is that if you and your attorney are not on your toes and fail to have a record taken before the Board of Zoning Appeals, your appeal to the Common Pleas Court is practically meaningless. And when I say have a record taken, I mean you should make absolutely certain that a competent shorthand reporter takes down all the testimony presented to the board, and that witnesses appearing to testify be placed under oath.

The men sitting on the board are very generally without any legal training or judicial experience, and unless firm measures are taken at such hearings, you can easily find yourself deprived of your rights by reason of not having a proper record made up. The responsibility of having such a record rests upon the individual; relying upon the board to take proper steps to assure a record would be little short of foolhardy.

So much for the zoning resolution itself. I should now like to talk generally about the impact of zoning on the sand and gravel industry and some of the economic and social factors involved in this problem. I assume that by this time all of you have had some personal experience with zoning restrictions, or if not personally, that you have at least discussed generally the problems presented by rural zoning.

Because of the present residential building boom, the continued increase in our population, and the desire of people to get out of urban areas into the country, there is an ever-increasing demand for rural zoning. These prospective home owners and those now residing in our townships are primarily interested in the most restrictive type of zoning. They quite naturally want the township zoned for private residences, business districts, and at the most, light industry. Of course, under the Ohio Enabling Statute the trustees cannot forbid agriculture in any district. However, the zoning authorities, being residents of the township, will see eye to eye with those persons seeking to limit the industry that can be carried on; and you will seldom, if ever, find a gravel pit operation a welcome classification. Such an operation, so say the opponents, is dangerous. Children may drown; it's dirty and noisy; the heavy trucks ruin the roads and increase traffic hazards; and an open pit defaces the land and depresses land values.

In the face of such arguments it is essential that the members of your association be able to combat them and demonstrate the importance of the sand and gravel industry to our economy. There are a number of factors which need to be considered. In the first place, sand and gravel can be mined only where they are found. It has been amazing to find so many people who really do not appreciate this simple proposition; they actually believe that if you dig deep enough, you can mine sand and gravel any place!

Another factor that should be developed before zoning officials is that gravel is a bulky commodity with a

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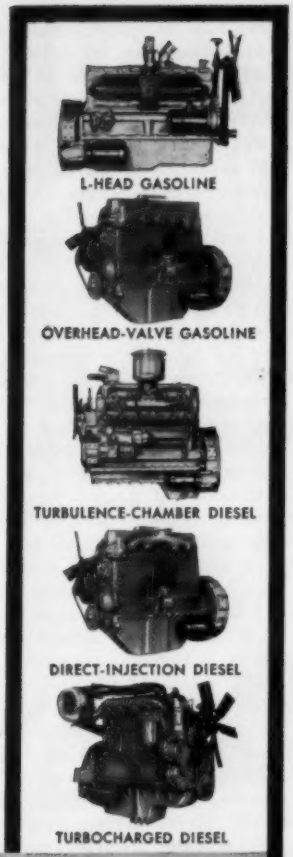

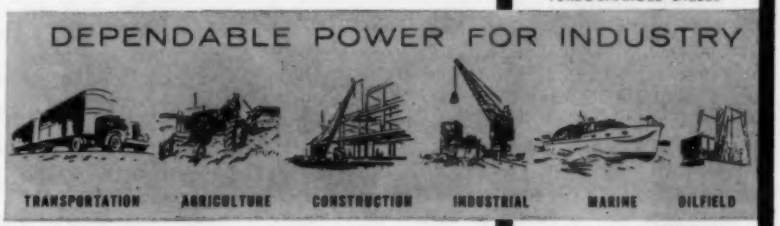

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very low intrinsic value in the ground, and that by reason thereof transportation costs are of prime importance in the economical introduction of gravel into the economy. As a direct consequence, it is necessary that gravel be produced near metropolitan areas, where its greatest market will be found.

Since gravel is used extensively in public construction, the taxpaying public has an interest in seeing that this valuable natural resource is produced at the minimum cost. Restrictive zoning will increase such cost.

Furthermore, once urban encroachment is permitted over valuable gravel deposits, they are for all practical purposes permanently withdrawn from the economy, and society is thereby the poorer. Sound zoning practice requires that such a valuable resource as sand and gravel shall first be extracted and the land then be used for building purposes.

I have heretofore made reference to a distinction drawn by some courts between a mining industry and a manufacturing . . . enterprise, a distinction which is logical and reasonable. Such courts point out that a manufacturing enterprise might be carried on anywhere, whereas a mining operation must be at the site of the minerals. One authority states the proposition thus:

"The regulation (zoning) has been regarded in particular cases as arbitrary, oppressive, and unreasonable, and as operating to take property without due process of law, or for public use without compensation. This is true where the excavations and other operations involved no threat to the health, safety, morals, or general welfare of the community, and could be made without substantial injury to adjoining property, where the district involved was a sparsely settled one, where the value of the site for residential purposes would eventually be enhanced by the removal of the mineral or other products, and where the property had scarcely any value other than the mineral or other products found thereon. In this respect, it has been repeatedly observed that there is a substantial difference between an enactment or ruling prohibiting a manufacturing or commercial business in a residential district which may be conducted in another locality with equal profit and advantage, and one which has the effect of wholly depriving the owner of land of the products thereof and of the right to remove or work them."

In addition to the above, I should like to point out another matter for consideration. If the gravel industry hopes to get proper classification under zoning laws, it must realistically and wholeheartedly enter into proper land use programs. It must carry forward with its mining operations, definite and farsighted reclamation, restoration, and rehabilitating programs. The general public will not tolerate worked-out pit areas and ugly scars in the earth. You all have seen the results of the strip mine operations in eastern Ohio. The industry failed to police itself so the state stepped in with positive legislation to regulate the former practices of the industry. The same thing can and will happen in the sand and gravel industry if it fails to meet its responsibilities . . .

As to nonconforming use, the Ohio statute expressly provides that if a use is being made of premises which is not in conformity with the zoning resolution at the time of its adoption, such nonconforming use may continue. Of course, this still leaves the question open as to just what constitutes a nonconforming use. Our Supreme Court of Ohio has recently held that mining on a tract of land on one side of a road does not establish a nonconforming use for a parcel of land on the other side of the road owned by the same company. I think this is an unsound principle; but, nevertheless, it is the law of Ohio until reversed.

Whether a bank-run operation would be such a nonconforming use as to authorize the operation of a modern plant is an open question. However, if you have land in an area that is about to be zoned, you should at least do some excavating on the land, and if it should be divided by a highway, such excavation should be upon both sides of the highway.

In this connection, I should like to call your attention to a Pennsylvania court decision in the case of *Borough of Cheswick vs. Beckman, et al.* In this case in the year 1938, 14 acres of gravel land was leased to one Sidwell; in the year 1940 Sidwell assigned the lease to the Bognars (defendants in the suit). Sidwell had processed materials at a different site from that used by the Bognars, who greatly extended operations and installed rotary screens. An injunction was granted by the lower court on the theory that there had not been a continuance of a pre-existing use. The upper court reversed this order, saying that the business was the excavation of sand and gravel; that it was not necessary that the entire tract should have been utilized at the time of the adoption of the ordinance; and the fact that modern and more effective instrumentalities were used did not bring the case within the ordinance.

To summarize, let me stress the following points:

1. The mere fact that rural zoning has been adopted does not necessarily mean that the extraction of sand and gravel cannot be carried on.
   a. Nonconforming use at time of adoption may continue.
   b. The enabling legislation or the local ordinance or resolution may specifically exempt mining.
   c. The ordinance must have been adopted in accordance with the procedure outlined in the enabling legislation.
   d. The ordinance must not be unreasonable, or arbitrary.
   e. The ordinance must bear a reasonable or substantial relation to the public health, safety, morals, welfare, and prosperity.

2. The sand and gravel industry, since it engages in the extraction of natural resources from the earth, is of great public interest. Proper land utilization requires that natural resources be incorporated into the economy as efficiently as possible. Urban encroachment on gravel deposits results in such deposits being permanently withdrawn from the economy. These factors should result in separate and favorable classification for the industry.

3. The sand and gravel industry should take steps to have reasonable exclusions with respect to the industry made a part of the enabling legislation.

4. Each individual operator should take similar steps.

4. Each individual operator will necessarily have to watch carefully the actions of the local governing body vested with authority to pass rural zoning legislation. All hearings should be attended; and the industry's case should be placed before the board, so that it can act intelligently.

5. Immediate steps should be taken by your association to amend the present enabling legislation in Ohio, so that an appeal from the Board of Zoning Appeals, a hearing *de novo* before the Common Pleas Court can be had. I believe that township zoning, insofar as industry and mining are concerned, will be a failure; those charged with the administration of the law do not have the necessary knowledge and they are too prejudiced in favor of extremely restrictive zoning.

6. Finally, the industry must realize that proper after-treatment and restoration of worked-out areas will be demanded by the general public.

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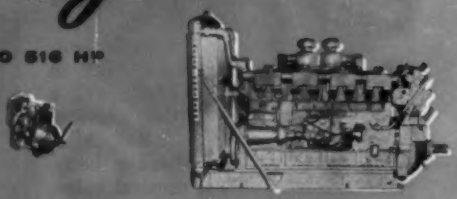

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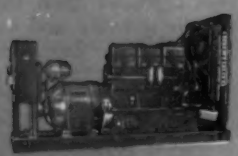

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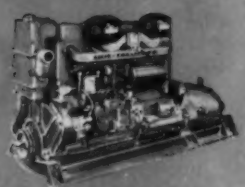

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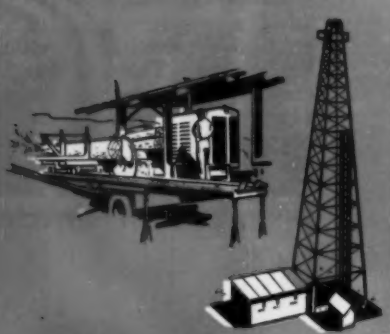

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1955 Mineral Output Reaches New Records In S. Central, S. W., and Mountain States

THIS report is compiled from preliminary data tabulated by the U. S. Bureau of Mines and various other agencies.

Arkansas mineral production value reached a new record high in 1955 for a total of $135,600,000, a slight increase over the previous 1954 record of $132,300,000. Mineral fuels were responsible for the 66 percent of the state's mineral value, nonmetallics for 23 percent, and metallics for 11 percent. The five principal commodities in order of their value in 1955 were crude oil, bauxite, natural gas liquids, stone, and sand and gravel.

Arkansas 1955 coal production was greater than that of 1954 in both quantity and value.

Arkansas was the leading producer of barite in the nation in 1955, when approximately 366,000 tons valued at $3,400,000, were produced.

Clay production in Arkansas was greater in 1955 than 1954, amounting to 652,000 tons, valued at $2,900,000.

Sand and gravel output increased from 6,611,860 tons in 1954 to 7,466,000 in 1955, valued at $7,839,000.

Stone production, consisting of limestone, sandstone, marble, and miscellaneous stone, was reported at 2,175,000 tons, valued at $2,827,000. Miscellaneous stone accounted for most of the stone produced, followed by limestone and sandstone. Production and value were both greater in 1955 than 1954.

Sulphur was recovered in the purification of natural gas. Recovery in 1955 amounted to 46,800 long tons, valued at $1,264,000.

Miscellaneous nonmetallics produced consisted of abrasives, cement, gypsum, lime, slate, and soapstone.

Arkansas remained the principal source of domestic bauxite in 1955. Production was reported at 1,800,000 tons, valued at $14,600,000.

Missouri mineral industries established a new record in 1955 with production valued at an estimated $147,200,000. This total was 4 percent greater in value than the record $141,000,000 established in 1952. Nonmetallic minerals were responsible for about 62 percent of this natural wealth, metals for about 30 percent, and mineral fuels for the remaining 8 percent. The five principal minerals in the state in 1955 were lead, cement, stone, coal, and lime. Missouri continued as the principal lead producing state in the nation for the 48th consecutive year, and contributed significant quantities of cement, clays, and stone.

Missouri reported production of eight metals—copper, cobalt, iron, lead, manganese, nickel, silver, and zinc. Lead remained the principal mineral in value, followed by iron and zinc.

Kansas mineral production (including mineral fuels) established a new record of $474,900,000, 6 percent greater than the previous record value in 1954. Mineral fuels continued to be the major natural resource in terms of value, accounting for almost 90 percent of the state total, followed by nonmetallics with 8 percent, and metals—lead and zinc—responsible for the remainder. Output and value of all minerals produced in Kansas exceeded or approximated those of 1954.

Coal production continued the decline begun four years before. Helium production of the government-operated plant at Otis continued near capacity operations in 1955. Production of natural gas increased 8 percent in quantity and value in 1955, as natural gas prices continued to rise. Kansas continued as a major producer of natural gas liquids in 1955, with a total value of $11,000,000.

Nonmetallic minerals of Kansas comprised cement, clays, gypsum, pumicite, salt, sand and gravel, and stone. All nonmetallic minerals except salt showed increases in 1955.

Most cement producers in Kansas operated above capacity during mid-1955. Of the seven cement plants, six produce portland cement and one natural cement. Production and value were slightly higher in 1955 than in 1954.

Clay production in 1955 increased 6 percent over 1954 output. Miscellaneous clays used in the manufacture of brick, tile, and other heavy clay products accounted for the major part of the production, with fire clay responsible for the remainder.

Salt continued to be produced in three Kansas counties in 1955. Production and value were down slightly from the preceding year.

The 1955 sand and gravel production increased considerably over the 1954 output. State and county road programs and accelerated building programs consumed the major part of this material. Considerable amounts were also used for railroad ballast. Commercial production was more than double that of noncommercial.

Output of stone (6,485,000 tons, valued at $8,175,000) showed a slight decrease in 1955. Limestone was responsible for the major portion of the production, followed by miscellaneous stone and sandstone. Major uses for limestone continued to be for concrete, road material, and riprap.

Lead and zinc were the only metallic minerals reported. Mine production of both lead and zinc increased over 1954, as base metal prices steadied during the year.

Oklahoma—All but two of Oklahoma's 19 minerals (including mineral fuels) showed an increase in the 1955 value over that of 1954. The total value of 1955 mineral production amounted to $722,900,000, 8 percent over the 1953 record value of $670,000,000. Mineral fuels accounted for 93 percent of this total 1955 value, nonmetals for 5 percent, and metals 2 percent.

The oil and gas industry of Oklahoma opened 121 new oil and gas pools in 1955. Discoveries were reported in 33 counties in 1955.

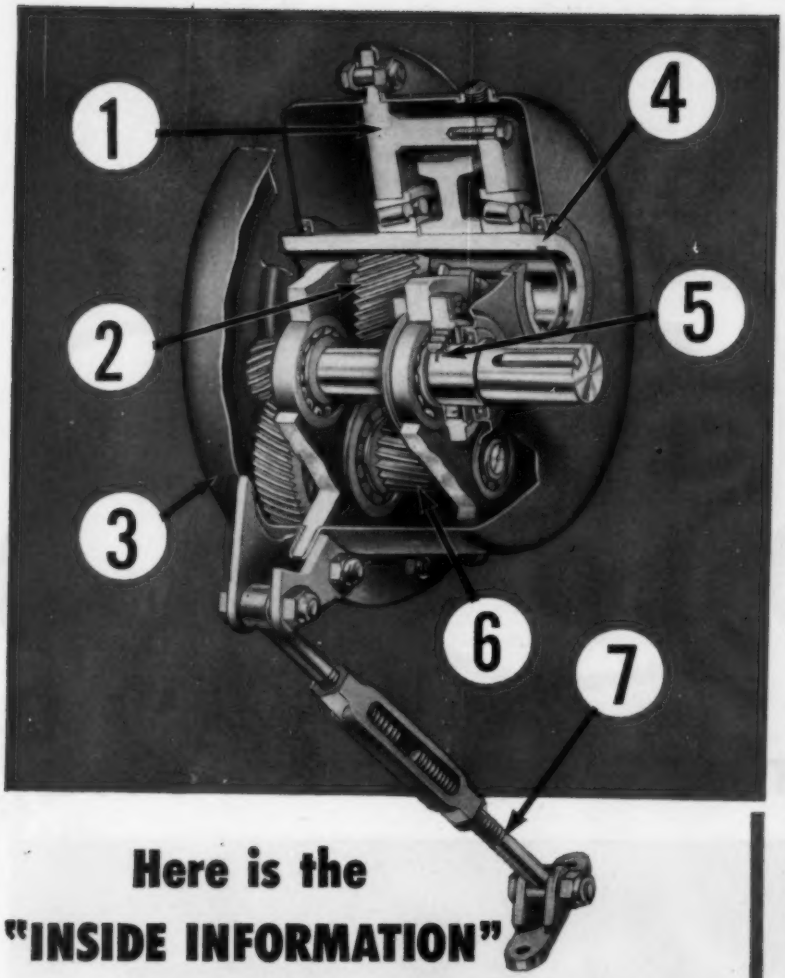
Coal production increased in Oklahoma. Nearly 2,000,000 tons of coal were produced, valued at approximately $12,000,000.

Marketed production of natural gas was 7 percent higher in 1955 than in 1954.

A total of 15,000 tons of recoverable lead, valued at $4,500,000, was produced—6 percent more in quantity and 15 percent in value than 1954. Mine production of recoverable zinc in Oklahoma decreased 6 percent to 40,570 tons from the 1954 output.

The estimated value of nonmetallic minerals produced in Oklahoma in 1955 was $29,800,000, an all-time high for the state. The previous record of over $26,300,000 was established in 1954; this figure was nearly

(*Continued on page* 138)



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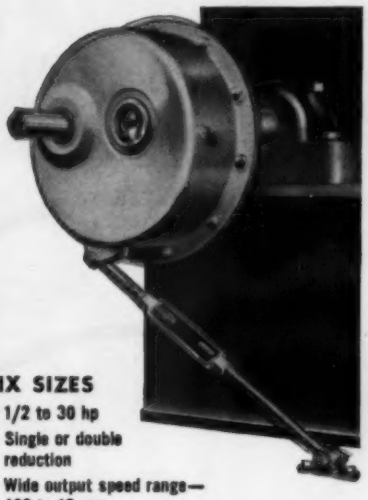

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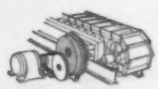
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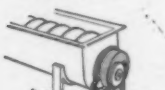
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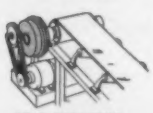
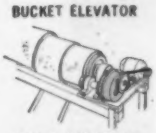

BELT CONVEYOR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THE FALK CORPORATION, Milwaukee 8, Wisconsin

MANUFACTURERS OF

- Motoreducers
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- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
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- Steel Castings
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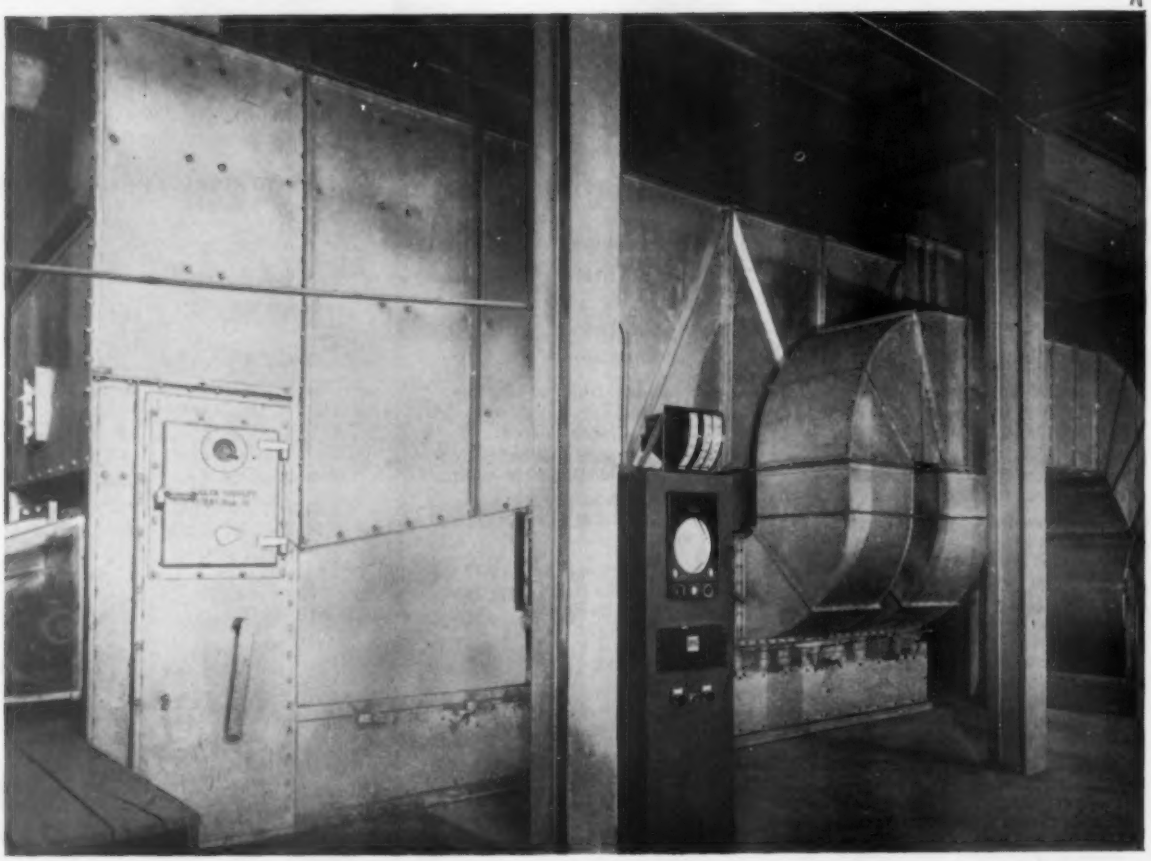
- Contract Machining

FALK

...a good name in industry

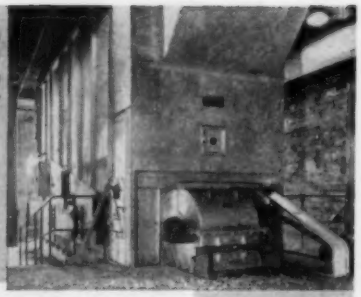
653

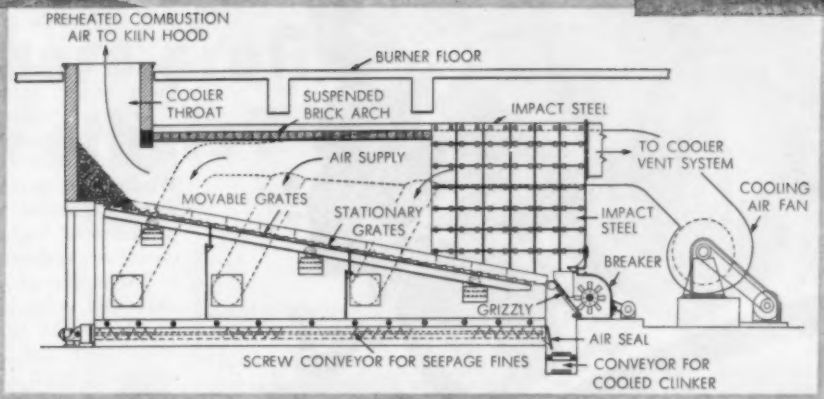
UNITS TESTIFY TO THE



One of the 10' x 60' Fuller Coolers assembled at our Catasauqua plant. Cooler now in use cooling phosphate nodules at rate of 1500 tons a day, temperature reduction from 2400 F to 250 F.

One of two Fuller Coolers installed in a southern cement plant for cooling 2200 bbl. clinker a day from 2500 F to 150 F.





FACT THAT

The Fuller Inclined-Grate Cooler Is Outstanding

Up-to-date 653 Fuller Inclined-Grate Coolers have been sold to the chemical process industry. This kind of endorsement, alone, tells a hard-to-argue-with performance story throughout the entire industry.

The two largest Fuller Coolers ever built have a grate surface 10 feet wide by 60 feet long, and handle phosphate nodules discharged from rotary gas-fired kilns at rate of 1500 tons a day. Temperatures are reduced from 2400 F to 250 F.

Fuller Coolers are used for cooling Portland cement clinker, pebble lime, ores, dolomite, iron nodules and phosphate nodules, with the characteristic Fuller efficiency that is the result of long experience and knowledge of industry needs.

Some of the features that make the Fuller Inclined-Grate Cooler one of the most active—and dependable—are listed here. For the complete cooler story, send for Bulletin CO-5.

FUEL SAVINGS. Users of Fuller Coolers have reported savings as high as 25 percent, as a result of the return of recuperated heat to the kiln or furnace.

FAST, EFFECTIVE AIR-QUENCHING. This feature of the Fuller Cooler allows the user to obtain specific quality effects when this result is required.

INCREASED GRINDABILITY OF CEMENT CLINKER. Laboratory tests and reports from users confirm this ability of the Fuller Cooler.

FULLER COMPANY
100 Bridge St., Catasauqua, Pa.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
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FULLER COMPANY GENERAL AMERICA

Fuller

...DESIGNERS AND BUILDERS OF BETTER CEMENT-PLANT EQUIPMENT FOR THIRTY YEARS...

CO-30T 3035

Drivers last longer...

when heavy-duty trucks

use J-M Brake Blocks

Experienced operators know that when their vehicles are equipped with Johns-Manville Brake Blocks they can handle crushing loads without personal danger.

That's because these rugged, durable J-M Brake Blocks are engineered for the job . . . and designed for dependable performance plus maximum service life on trucks, shovels and heavy machinery.

They are "standard parts" on many famous makes of heavy-duty units. For fast, easy replacement, they are now available in Johns-Manville Assembled Sets that put new safety into your equipment.

See your Johns-Manville Distributor for data on J-M Brake Linings and Clutch Facings for industrial equipment, or write Johns-Manville, Box 14, New York 16, N. Y.

Johns-Manville Industrial Friction Sets are available in a wide range of molded or woven, rigid or flexible asbestos materials.

Johns-Manville
INDUSTRIAL FRICTION MATERIALS

1955 Mineral Output

(*From page* 134)

equaled in 1953, indicating that for the past three years the production of nonmetallics has shown a significant rising trend. Gains were shown for all nonmetallic minerals except pumicite (volcanic ash) and tripoli, which approximated 1954 production totals. The net gain reflects increased activity in the construction field and in the glass industry.

Output of native asphalt from Murray County was greater in both quantity and value than in 1954.

Cement production in Oklahoma in 1955 established a new record as cement plants in Pontotoc and Washington counties operated above rated capacities to supply an unprecedented highway and building construction demand for concrete.

Production of clays in 1955 was estimated to be 475,000 tons, valued at $1,300,000, up nearly 6 percent in tonnage and 5 percent in value compared with 1954.

Output of gypsum increased in 1955 to establish new records of both quantity and value, as demand for building materials continued unabated.

Lime production in 1955 increased over 1954 as demand for building materials continued.

Output of pumicite was reported from Beaver County. Production and value approximated that of 1954.

Salt was reported from Beckham, Harmon, and Woods counties by three producers. Output and value were slightly higher than in 1954.

Records for tonnage and value of sand and gravel were broken in 1955. Estimated production was 5,400,000 tons, valued at more than $4,800,000. The new totals surpassed records set in 1952, 1953, and 1954. Increases were reported both in the number of plants and in the production per plant, in response to rising construction demands.

New records are indicated for production of stone, the estimated 9,800,000 tons valued at $10,200,000, representing a 20 percent increase in quantity and value above 1954. The most important commodities in this group are crushed limestone, chat, and dimension granite.

Sulphur was recovered from waste natural gases in Marshall County. Output and value of tripoli produced in Ottawa County approximated the 1954 figures.

New Mexico's mineral output excluding uranium and manganese ore shipped to government stock-

(*Continued on page* 142)

Why do some crushers earn more profit than others?

There can be several answers to the above question . . . but the most successful producers are generally those who *keep maintenance costs down.*

That, in a nutshell, is why more and more crusher men are switching to ORO Manganese replacement parts. They've found that when crushing surfaces are made from this remarkable metal, they give up to 25% longer service.

There are three reasons.

First, by use of several alloy additions, Kensington engineers have succeeded in developing a number of remarkable wear-resistant alloyed manganese steels. These metals actually *fight back* when exposed to wear.

Parts made from ORO KENKROME, for example, have unusual initial hardness, but develop an even greater *surface hardness* when exposed to impact. But while their surface becomes harder and harder, the metal underneath always remains tough . . . better able to stand the shocks and stresses which shatter less durable metals.

Second, Kensington's own scientific process of heat treating gives these metals a structure superior to that of ordinary manganese steels . . . and makes them even better equipped to resist wear.

Third, in most instances the original design has been improved. Kensington's Quad-edge, renewable hammer tips offer a good example. This exclusive design provides *four* service edges. In most cases, half the metal can be worn away before replacement is necessary. Hammer shanks may be used over and over again.

The following replacement parts are available in ORO Manganese:

- Jaw and cheek plates *(for jaw crushers)*
- Roll shells, smooth and corrugated *(for roll crushers)*
- Mantles, bowl liners *(for cone crushers)*
- Mantles, concaves *(for gyratory crushers)*
- Hammers, grates, liners *(for pulverizers)*
- Shell and end liners, screens *(ball, rod, tube mills)*
- Cages (impellers) and liners *(for disintegrators)*

Despite their longer life, *these cost no more than ordinary parts.*

It will take only one trial to prove to you that ORO Manganese is all we claim. There's a great possibility that the coupon below may save you hundreds of dollars.

Mail it today.

Wear Resisting ORO Manganese Replacement Parts

Long-wearing mantles and bowl liners for cone crushers.
Roll shells for all standard roll crushers.
Concaves (regular, non-choking, or reduction type) for gyratory crushers.
Quad-Edge renewable-tip and conventional one-piece hammers for hammer mills.

Kensington STEEL COMPANY

KENSINGTON STEEL CO., Dept. P, 505 Kensington Ave., Chicago 28, Ill.
SUBSIDIARY OF POOR & COMPANY • CHICAGO

☐ Quote Prices ☐ Have Representative Call ☐ Send Literature

Type of Crusher_____ Make_____

Size_____ Casting Part Number_____

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

Drivers last longer...

when heavy-duty trucks use J-M Brake Blocks

Experienced operators know that when their vehicles are equipped with Johns-Manville Brake Blocks they can handle crushing loads without personal danger.

That's because these rugged, durable J-M Brake Blocks are engineered for the job . . . and designed for dependable performance plus maximum service life on trucks, shovels and heavy machinery.

They are "standard parts" on many famous makes of heavy-duty units. For fast, easy replacement, they are now available in Johns-Manville Assembled Sets that put new safety into your equipment.

See your Johns-Manville Distributor for data on J-M Brake Linings and Clutch Facings for industrial equipment, or write Johns-Manville, Box 14, New York 16, N. Y.

Johns-Manville Industrial Friction Sets are available in a wide range of molded or woven, rigid or flexible asbestos materials.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville

INDUSTRIAL FRICTION MATERIALS

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(*From page* 134)

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Despite their longer life, *these cost no more than ordinary parts.*

It will take only one trial to prove to you that ORO Manganese is all we claim. There's a great possibility that the coupon below may save you hundreds of dollars.

Mail it today.

Wear Resisting ORO Manganese Replacement Parts

Long-wearing mantles and bowl liners for cone crushers.
Roll shells for all standard roll crushers.
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Quad-Edge renewable-tip and conventional one-piece hammers for hammer mills.

Kensington STEEL COMPANY

KENSINGTON STEEL CO., Dept. P, 505 Kensington Ave., Chicago 28, Ill.
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☐ Quote Prices ☐ Have Representative Call ☐ Send Literature

Type of Crusher_____ Make_____

Size_____ Casting Part Number_____

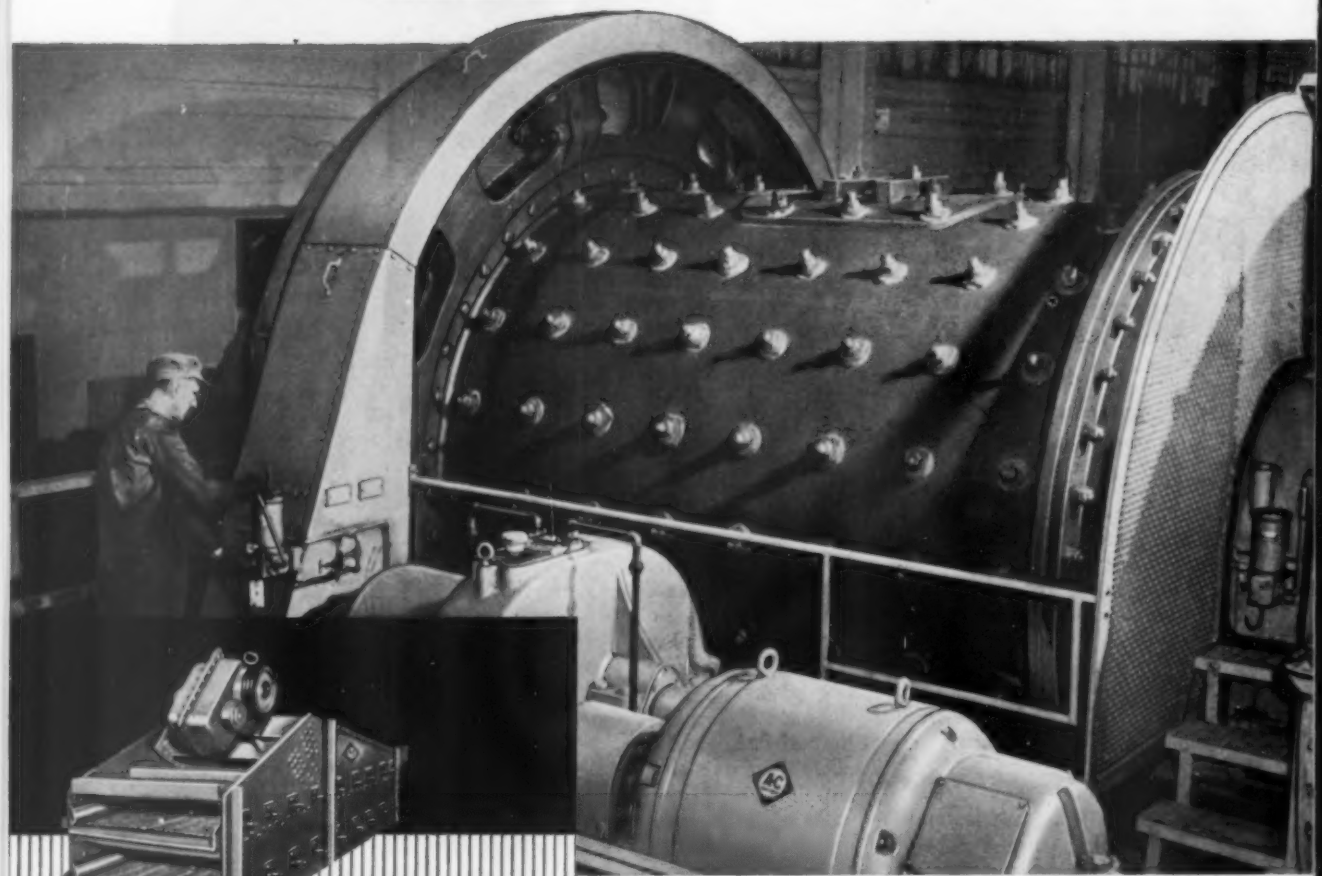
NAME_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

You Get MORE than Equipment When

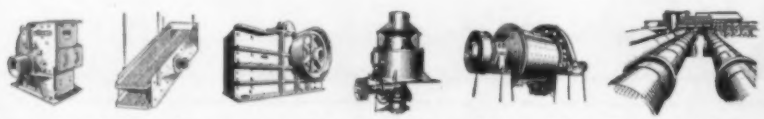


"Coordineered" Equipment for the Mining and Rock Products Industries

GRINDING MILLS—Whether your process calls for individual mills or a grouped stage grinding series, Allis-Chalmers can make a right-for-the-job recommendation from seven different types of grinding mills.

VIBRATING SCREENS—Allis-Chalmers screens are built in single and multiple-deck models for use in scalping, wet or dry sizing, washing, rinsing, dewatering, and media recovery.

GYRATORY CRUSHERS—"One-man, one-minute product control" slashes the time it takes to change crusher setting from hours to seconds. Size adjustment, compensation for wear and emergency unloading are accomplished at the flick of a switch.



Hammermills • Vibrating Screens • Jaw and Gyratory Crushers • Grinding Mills • Kilns, Coolers, Dryers

ALLIS-

You Buy From ALLIS-CHALMERS

The Plus is the "Coordineered" Approach to Equipment Development and Application

BECAUSE Allis-Chalmers makes so many types of equipment used in the mining industry, it is the *one* company that can team up its thinking, planning and engineering in designing, building and application. We call it "coordineering."

In this unique approach, your A-C team draws from a background of over a century of experience and an unparalleled concentration of field and laboratory data . . . detailed information on the processing of practically every material mined and quarried throughout the world.

Better Equipment, Better Methods, Better Results for You

The utilization of this experience and intimate knowledge of your requirements has, of course, influenced the outstanding development and advanced design of Allis-Chalmers equipment. But more than that, these factors, combined with A-C diversification, have made possible the "coordineering" of related equipment in smooth, profitable processing arrangements in plants everywhere.

For more about the "more" you get, see your Allis-Chalmers representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

The A-C laboratory is one of the best equipped, best staffed in all industry. Information obtained in laboratory and pilot plant testing helps determine the equipment and process best suited to a given application.

This bulletin with its explanation of the "work index" formula enables you to evaluate any size reduction operation . . . compare efficiency of plants, circuits and machine. It offers the only practical approach to improving performance . . . of determining the right machine for a job. Write for Bulletin 07R7995.

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SCREENS or CONVEYORS

for dredge, plant, or mine...

CONSULT YUBA

YUBA-built revolving screen, 50' long, 9' diameter, weight about 65 tons.

You get long wear, reduce shutdowns for replacement when separating, scrubbing or sizing with YUBA Screens. They're made from Abrasion Resisting Steel plate, a high carbon, high manganese alloy steel with Brinnell hardness of 200 to 250. Taper drilled holes prevent clogging, can be small and closely spaced for screening monazite sands and other rare earths. For flat or revolving screens, in all thicknesses from 3/16" up; other dimensions as needed. Screens with cast manganese steel plates also can be furnished.

Conveying rock, sand and gravel has been part of YUBA's business ever since 1909. We've built hundreds of heavy-duty conveyors for use on dredges, in pits and at plants.

Bring your screen and conveyor problems to us for recommendations and estimates. No obligation. Wire, write or call TODAY.

YUBA-built conveyor stacker for conveying rock tailings from revolving screen on YUBA placer dredge to rock piles astern. 44" belt, 225' long.

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1955 Mineral Output

(*From page* 138)

piles reached a new record high value of $423,659,000 in 1955. This 11 percent gain over 1954 resulted largely from increased production of petroleum, and to a lesser degree, from gains in output of potash, natural-gas liquids, and sand and gravel. Production of zinc showed a remarkable gain because of resumption of mining activity following a year of idleness.

Of the state's total value of minerals produced in 1955, mineral fuels accounted for $289,082,000 (69 percent), nonmetallic minerals $80,185,000 (19 percent), and metallic minerals $54,392,000 (13 percent).

Output of beryl continued its upward trend, in 1955, 125 tons of handsorted beryl having been produced from mines in Taos, San Miguel, and Rio Arriba counties. Columbium-tantalum was produced as a by-product of pegmatite.

Production of copper increased 7 percent over 1954. Gold production decreased 43 percent, the lowest in 89 years. Iron-ore production nearly doubled the 1954 figure. New Mexico was the only molybdenum-producing state that showed an increase in the shipments of molybdenum concentrate in 1955. Production of silver more than doubled in 1955 as a result of the reopening of lead-zinc mines. Silver production from other sources either remained stable or decreased in 1955.

Uranium mining and exploration continued to center in Valencia, McKinley, and San Juan counties, but prospecting extended to many other counties. It was announced that American Metals will finance a new processing mill in the McKinley County area, to be ready for operation late in 1956 or early in 1957. Vanadium was recovered as a by-product from the processing of uranium ores. Output of zinc reached 15,300 short tons.

According to an announcement by the Onego Corp., a large find of rare-earth-bearing sands has been discovered in San Migual County, N. M. The 332 acres of placer and lode claims known as the Lost Creek group are said to contain 4,000,000 tons of sands carrying monazite, gallium, cerium, lanthanum, titanium, yttrium, ytterbium, and magnesium.

The Mex-Tex Mining Co. recovered barite and lead concentrate from ore mixed at its Royal Flush mine near San Antonio, Socorro County.

It will pay you to **LEAP** *into this profitable new business...*

"LIGHTWEIGHT AGGREGATE"

...but LOOK first

HERE'S WHAT YOU SHOULD KNOW!

There are hundreds of different types of clays and shales—all with different bloating characteristics.

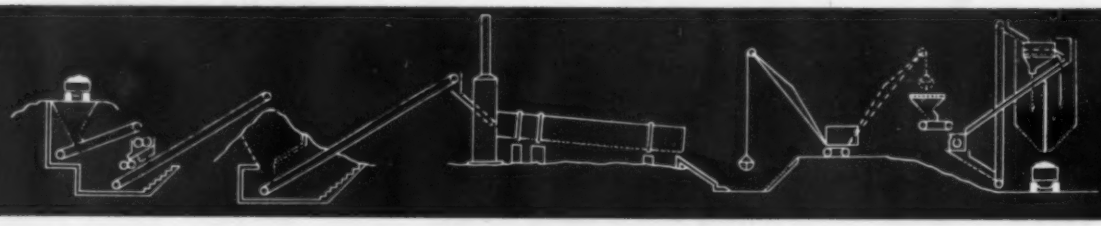
The selection of the process for preparing lightweight aggregate of the proper characteristics and size is determined by the raw material and must be made with care. McNally Pittsburg researchers, designers, and engineers have conducted a careful study of the best processing methods, and the design and construction of plants and equipment for the profitable manufacture and processing of lightweight aggregates in all parts of the country.

Last year there wasn't enough lightweight aggregate to "go around."

America's greatest Building Boom is just getting under way—and no end in sight for at least 10 years.

Builders and architects are fast turning to concrete and blocks made with lightweight aggregate!

That's why the wise operators are saying, "Let's get into a new business, 'LIGHTWEIGHT AGGREGATE.'"



"Ask the men who know"

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DESIGNERS AND BUILDERS OF EQUIPMENT FOR BASIC INDUSTRY

COMPLETE PLANTS OR SINGLE MACHINES

Clay Disintegrators
Clinker Breakers
Conveyors • Coolers • Hoists
Jaw Crushers • Kilns
Roll Crushers • Vibrators
Apron and Reciprocating Feeders
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Gentlemen:

Please send brochure on Lightweight Aggregate plants. ☐

Desired capacity of plant per day is _____.

Shale ☐ **Clay** ☐

Name_____ **Title**_____

Company_____

City and State_____

New! Versatile! Portable!

Mobile Drill Model B-40, with a rugged 15 h.p. hydraulic motor to supply positive, continuous drilling action!

MOBILE

ALL-HYDRAULICALLY POWERED DRILL

MODEL B-40

A COMPLETE LINE OF MOBILE DRILLS

INVESTIGATE!

MODEL B-27

● Light! Powerful! Field proven for exploratory work in unconsolidated formations. Mounts on Willys vehicles P.T.O. driven. America's most outstanding light, portable rig.

MODEL B-35

● A convertible drill for vertical-horizontal work, featuring a new safety hydraulic clutch. Willys mounted, operated by P.T.O.

MODEL B-36

● A tough, portable rig for heavier formations and P.T.O. operated. Mounts on any 4-wheel drive International or Dodge Power Wagon.

MODEL B-52

● Heavy-duty! Operated by Ford Industrial Power Plant. Built to withstand terrific torque of toughest formations. Adaptable to a really extensive list of uses.

Cores and augers vertically or horizontally. Brings economy to under-highway boring.

Light, powerful, low-cost drilling . . . yours, with the new Mobile Drill Model B-40. This one-man-operated rig easily mounts or dismounts on the front, rear, or side of *all* vehicles, including wheel or crawler tractors. Cores with air *or* water to 200', augers to 75' in *minutes*. The B-40 quickly converts to *any* degree in a 360° angle, cuts costs on underground water, gas, and power-line installations. Light enough for air transport to remote areas, powerful enough for a complete range of tough exploratory jobs. Never before has such a LOW COST drill with such amazing power and versatility been offered. Write, 'phone, or wire today for complete information!

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World's Largest Manufacturer of Light Vehicle Powered Drills

Fire clay and shale were the only types of clay sold in the state during 1955 and shipments were 4 percent higher than in 1954. It was reported that a new bentonite processing plant had been started at Gallup during 1955. About 45 tons of bentonite from a deposit near Sanders, Ariz., will be ground and packaged per month.

Production of crude fluorspar in New Mexico dropped to nothing in 1955, and there are no indications that mining will be resumed in the near future. This cessation of fluorspar-mining activities has been blamed on the flood of imports of this mineral into the United States. Shipments of sheet mica to the government purchasing depot at Custer, S. D., doubled the 1954 figure.

Perlite production set a new record in 1955—127,000 tons; this was 14 percent greater than in 1954. Three companies operated crushing-drying-sizing plants at or near their open-pit mines.

Shipments of potash increased 8 percent over 1954 and rose to 1,-864,000 tons (K_2O equivalent) valued at $67,600,000—the highest for any mineral produced in the state except petroleum. Two new expansion programs were announced by established producers during 1955.

Output of pumice, pumicite, and scoria remained at relatively the same level as that reported in 1954. The major portion of the total sales, however, was consumed in making concrete aggregate and block.

Structural and paving sand and gravel in 1955 gained 4 percent in production over 1954. Commercial output (production by private companies) accounted for 90 percent of the total production, and noncommercial production (produced by state and county highway departments) the remainder.

Among the most important types of stone produced in New Mexico during 1955, in terms of value, were basalt and limestone. Total output of stone was slightly higher than in 1954. Nearly all the stone produced was of the miscellaneous variety and was consumed in the maintenance and construction of public roads.

For the first time in many years, coal output in New Mexico showed an increase.

Annual production of crude petroleum in New Mexico increased from 75,200,000 bbl., valued at $206,800,000, in 1954 to 80,852,000 bbl., valued at $222,343,000 in 1955 and accounted for 52 percent of the state's total mineral wealth.

REDUCE CYCLE TIME BETWEEN CUT AND FILL

GET MORE TRACTION . . . LONGER TIRE LIFE

with Firestone NYLON TIRES

FIRESTONE NYLON TIRES are built to keep your job on the move. They have the extra traction and extra strength needed to reduce your equipment's cycle time and tire costs.

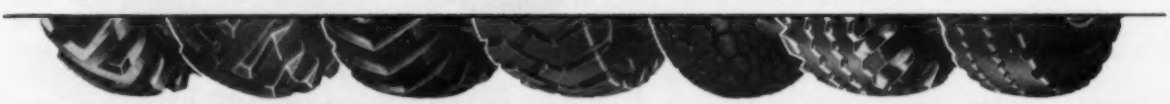
The treads of Firestone Nylon Tires are built to give maximum traction on the toughest haul, and they are extra tough to resist cutting. Double-thick sidewalls give added protection against cuts and snags.

Firestone's Safety-Tensioned *Gum-Dipped*® nylon cord body gives the greatest protection against impact breaks . . . flex breaks . . . heat failures . . . and water damage.

Firestone has a complete line of nylon off-the-highway tires . . . job engineered tires for every piece of earthmoving equipment.

Call your Firestone Dealer or Store for cost-cutting Firestone Nylon Tires and complete off-the-highway tire service.

A TIRE FOR EVERY ROAD, LOAD AND CONDITION OF SERVICE



GROUND GRIP GG WIDE BASE ROCK GRIP RG WIDE BASE ALL NON-SKID ALL TRACTION RIB EXCAVATOR

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TEST REPORT
PRODUCT: Calumet Ni-Hard* grinding balls.
COMMENTS: Entire first year's production of Calumet Ni-Hard grinding balls used in a one-year test in wet grinding copper ore in Calumet's own mills. Results: 75% greater resistance to wear; 40% reduction in grinding ball costs per ton of ore ground!

"We found CALUMET NI-HARD GRINDING BALLS so good we use them ourselves!"

You can't beat this kind of enthusiasm — or results! **Calumet Division actually tested their Ni-Hard grinding balls with the results stated above. From this experience, Calumet knows exactly what a user wants in grinding ability, durability, initial cost and overall costs.**

Compared with forged steel balls in dry grinding, Calumet Ni-Hard grinding balls proved to be *4 to 1 times greater in wear resistance!*

Calumet Ni-Hard grinding balls are rigidly quality controlled—laboratory tested to insure meeting Calumet's own high standards. They are available from stock in the following sizes: 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2" and 2". Try Calumet Ni-Hard grinding balls in your own mill. See for yourself how they can increase tonnage and lower costs. Write today for more information.

**Reg. U.S. Pat. Off., Intl. Nickel Co., Inc.*

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Arizona—Total value of Arizona's mineral production in 1955, exclusive of uranium and manganese, reached $368,258,000, a remarkable gain of 46 percent, due largely to the higher average price of copper during the year.

The value of metallic production in 1955 was $353,837,000, of 96 percent of the total value for all minerals; nonmetallic, $14,391,000, or 4 percent of the total; and mineral fuels (coal), $30,000.

In addition to copper, in the metallic-minerals group, gold, lead, mercury, silver, vanadium, and zinc increased in value of output; in contrast, molybdenum and tungsten decreased in value. Managanese ore shipped to depots for stockpiling will be credited to the year in which the beneficiated product is shipped, rather than to 1955 production.

Among the nonmetallic minerals, clay, gypsum, lime, perlite, sand and gravel, stone, asbestos, cement, and feldspar showed gains in value of production; production of barite and gem stones remained at 1954 levels; and fluorspar, mica, pumice, and silica quartz) showed declines in production.

Pegmatite deposits worked for mica, columbium-tantalum, and other minerals yielded a small quantity of hand-sorted beryl concentrates. Some small shipments of columbium-tantalum and lithium were made.

Asbestos production continued to increase in 1955, rising 4 percent above the 1954 production total. A local outlet for the high-grade asbestos fiber produced in the Globe area was provided by the continued operation of the government purchase depot by the General Services Administration. Barite production dropped slightly from the 1954 level.

Bentonite, shale, and fire clay were the only types of clay produced in Arizona during 1955, and production in 1955 was 4 percent greater than in 1954.

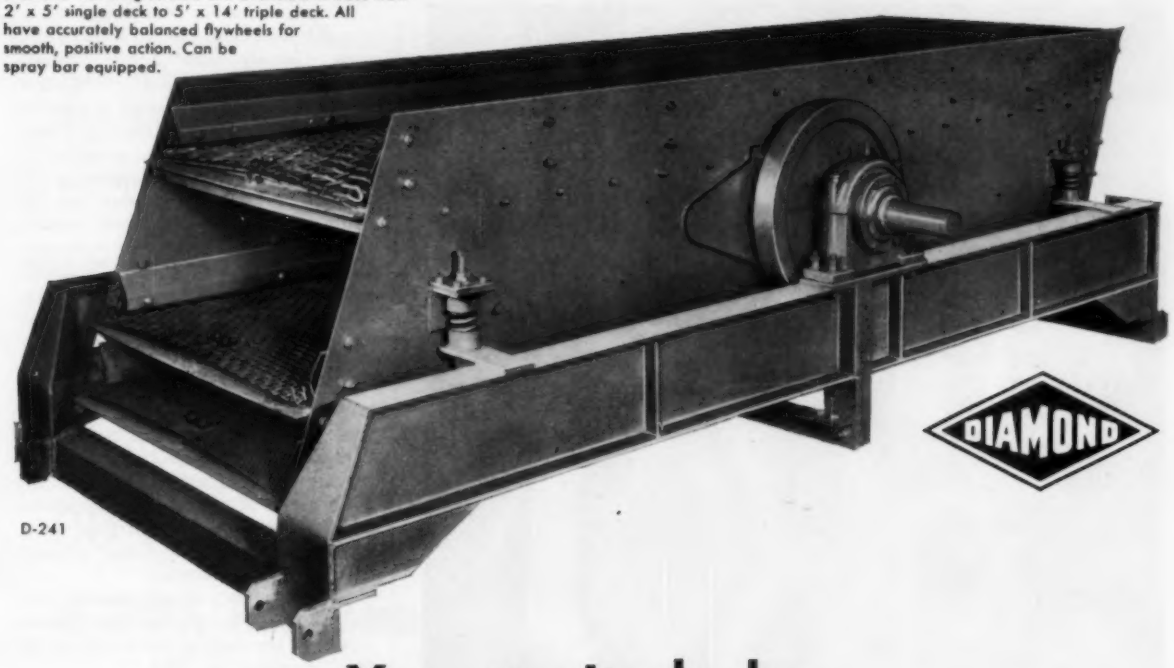
Fluorspar output in 1955 dropped to the lowest level in many years. The only crude output reported was shipped to a mill in New Mexico.

Arizona's gypsum industry continued to expand during 1955 and registered a 3 percent production gain over 1954.

Chemical and building lime were the only types of lime produced, and output from the state's four lime plants decreased 10 percent from the 1954 production total.

Arizona's only cement plant at Rillito increased its output 11 percent over 1954, in following the accelerated building trend prevalent in the Rocky Mountain area.

Diamond vibrating screens are available in sizes from 2' x 5' single deck to 5' x 14' triple deck. All have accurately balanced flywheels for smooth, positive action. Can be spray bar equipped.



D-241

You can't choke a Diamond BALANCED Vibrating Screen!

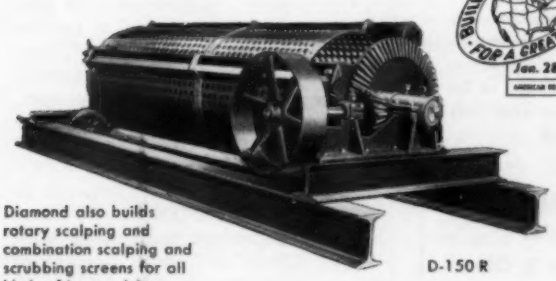
No screen at any price works harder and does more than a Diamond. It's fast . . . does a thorough job of separating materials without clogging and can be depended on for long, trouble-free operation.

Here's why. Generous space between decks of a Diamond BALANCED Vibrating screen provides ample clearance for material to pass. High walls prevent overflow. An eccentric shaft transmits circular, pulsating motion with a pronounced vibration over the entire length and width of the screening area without affecting supporting members. And Diamond's method of screen cloth anchoring with center rise causes material to automatically work toward the sides.

Operation and maintenance costs of a Diamond are kept way below levels that might normally be considered "acceptable."

You can choose your Diamond BALANCED vibrating screen from a variety of sizes and capacities. Reinforced side plates are standard, shackle or cable suspension mountings optional.

Every day, more and more companies are benefiting from the efficiencies and economies of Diamond BALANCED vibrating screens. Get full details today.



Diamond also builds rotary scalping and combination scalping and scrubbing screens for all kinds of heavy duty.

D-150 R

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GOODMAN MANUFACTURING COMPANY
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Address_____

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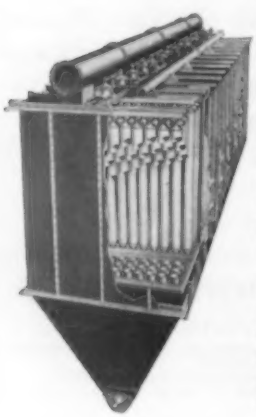
That's the guarantee you get with **Norblo** Automatic Bag Type Arresters

By "constant" we mean what operating men *expect* it to mean when applied to dust collection — *no* loss of suction drop, *no* down time, *no* variation in capacity.



Norblo's unit compartment system, with automatically controlled progressive and cyclic bag cleaning maintains the full capacity for which the particular installation is engineered. Bag cleaning is easily regulated if dust loading rate should change. Only one compartment is cut out at a time for cleaning (and that for only a few seconds) by means of moderate shaking which insures long bag life. A small quantity of reverse air is used to prevent unwanted dust flow during shaking operation. Excess dust is dropped without destroying the desirable basic filter cake.

Profitable, consistent performance of Norblo automatic dust and fume collection equipment is demonstrated in hundreds of important installations. If you need this facility for production, for salvage, or for good housekeeping, ask Norblo engineers what they can do for you. Write for Bulletin 164-4.

The Northern Blower Company

Engineered Dust Collection Systems for All Industries

6407 Barberton Ave. OLympic 1-1300 Cleveland 2, Ohio

Mica production continued at a low ebb and only one mill in Maricopa County was active. Small quantities of scrap mica were mined in Maricopa and Yuma Counties and shipped to the grinding plant at Buckeye.

Perlite production showed a 54 percent increase. Production of pumice and pumicite, used mainly in the manufacturing of concrete blocks, fell to 3,400 tons in 1955 from 80,883 tons in 1954. The only production reported during the year came from a pit near Safford operated by the Gila Valley Block Co.

Structural and paving sand and gravel in 1955 registered a 4 percent gain in production over 1954. Commercial output (produced by private companies) accounted for 80 percent of the total production, and noncommercial (produced by state and county highway departments) the remainder.

Crushed silica (quartz) was produced in Cochise and Mohave counties, and the output remained at the level reported in 1954.

The most important stones produced in Arizona during 1955 in terms of value were crushed limestone, dimension and crushed sandstone, the overall category classed as miscellaneous stone, and crushed granite. The state's total output of stone rose slightly in 1955. Crushed limestone was used mainly for flux in copper smelting and road improvements, and the remaining stones mentioned were consumed in building and road construction.

The first production of commercial-grade petroleum in Arizona was reported.

Utah—The overall value of mineral production in Utah advanced 27 percent over the figure for 1954, and nearly every mineral commodity produced in the state showed an increase in output and value. The marked $69,000,000 rise in the total value was a reflection of the increased production of copper (coupled with the high price) attained despite a 45-day shutdown by a strike in July and August.

Of the total value of minerals in 1955, copper contributed 52.5 percent, coal 13.3, iron ore 7.4, molybdenum 3.8, gold 4.8, lead 4.4, zinc 3.1, silver 1.7, and other minerals 9.0 percent. Five metals — copper, gold, lead, silver, and zinc, valued at $217,173,000—accounted for 67 percent of the total value.

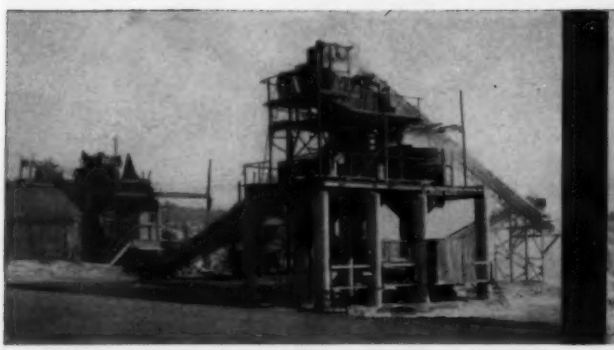
The value of metallic minerals in 1955 was $254,740,000, or 78 percent of the toal value; nonmetallic minerals, $20,497,000, or 6 percent of

(*Continued on page* 154)

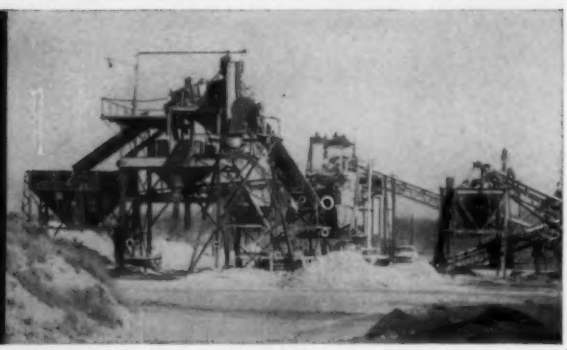
"to keep grizzly materials moving, we had to have three men pushing and shoving,"

reports Mr. Ray Holman, Quarry Superintendent, Quartzite Stone Company, Inc. of Lincoln, Kansas.

"JEFFREY grizzly feeders increased production at each plant 30 tons per hour... a 30% increase"



The Lincoln Plant installed a 5' x 10' long Jeffrey grizzly feeder in September, 1949.



Quartzite Company's Wolf Creek Plant added a similar Jeffrey grizzly feeder in May, 1952.

Grizzly materials are often difficult to keep moving here, especially when they're wet. Even with three men on these bar screens, rock didn't get to the crushers as fast as these plants could handle it.

Addition of Jeffrey electric vibrating feeders eliminated the need for the three men at the grizzlies and permitted later operations to work at capacity. Mr. Holman estimates that each plant was able to boost production by 30 tons—to 125 tons per hour.

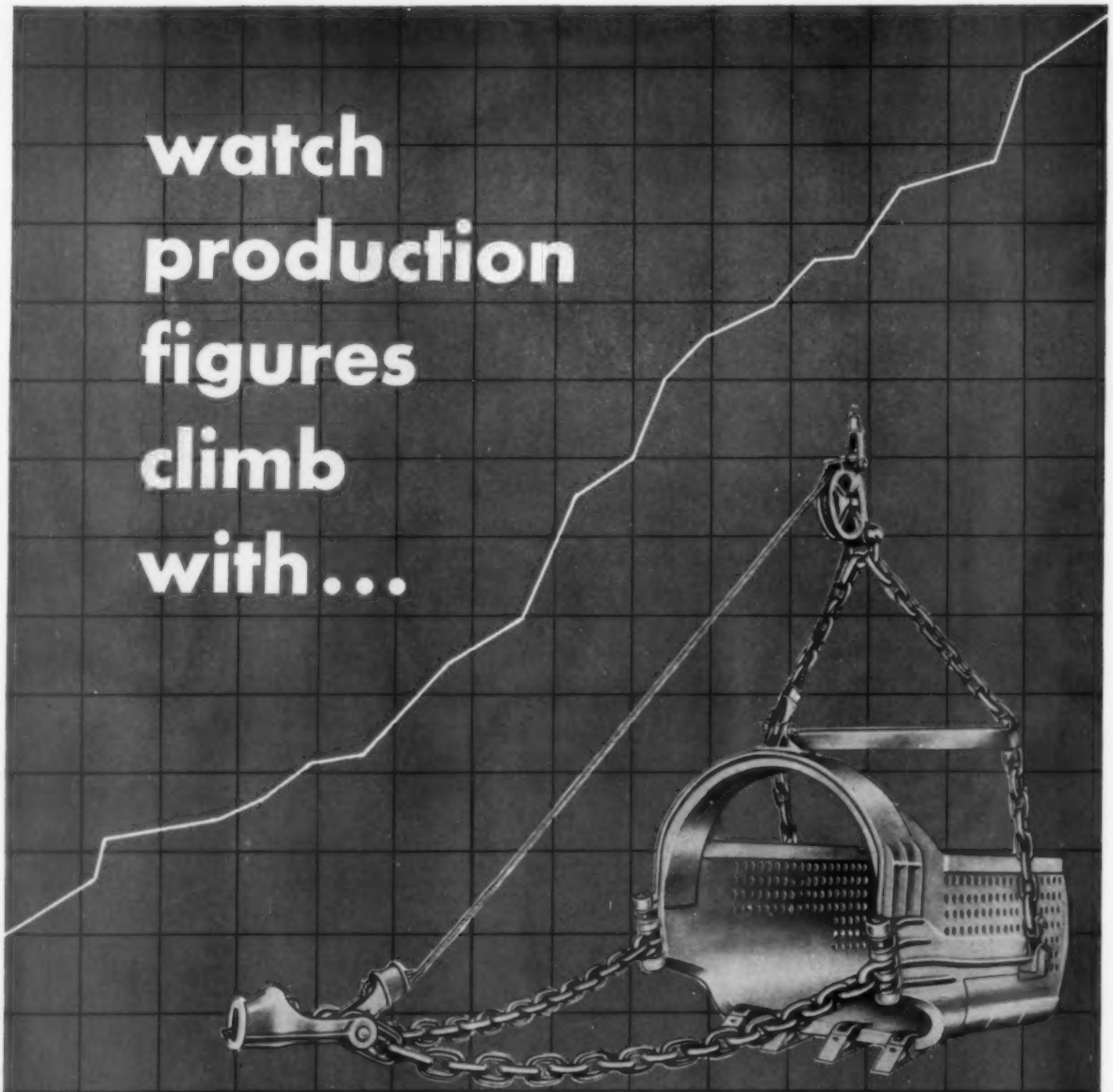
Regarding maintenance on this Jeffrey equipment, he says, "Nothing beyond renewing the grizzly bars occasionally."

THE JEFFREY MANUFACTURING COMPANY • Columbus 16, Ohio

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT
TRANSMISSION MACHINERY • CONTRACT MANUFACTURING

watch production figures climb with...



HENDRIX DRAGLINE BUCKETS

A TYPE FOR EVERY DIGGING PURPOSE

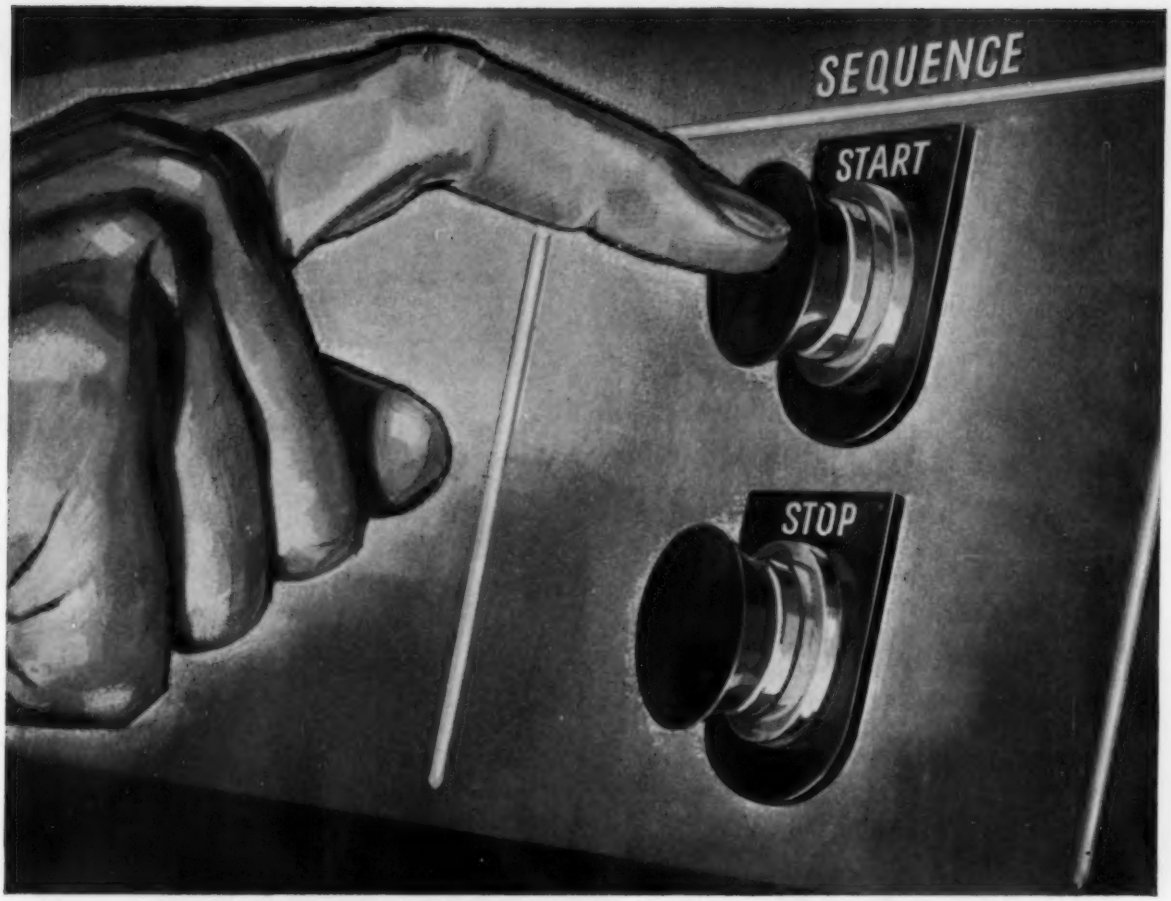
¼ to 40 Cubic Yards

All Hendrix Buckets available without perforations

Hendrix Lightweight Dragline Buckets

HENDRIX MANUFACTURING CO., Inc.
MANSFIELD, LOUISIANA

See you at the ROAD SHOW — CHICAGO
Jan. 28-Feb. 2, 1957

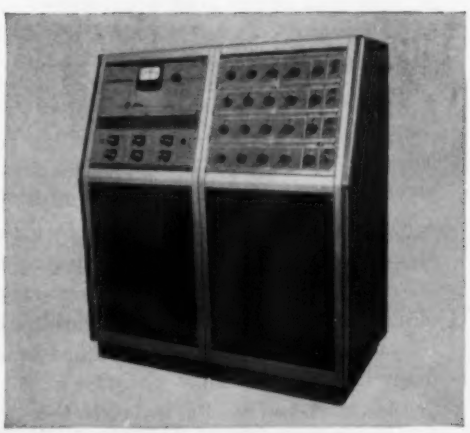


Got a job for the Batchetron?

Here's what it will do. Operating electronically from a remote control station, the Fairbanks-Morse Batchetron can be preset with knobs and buttons to assemble accurate quantities of dry and liquid components from any one or more bins or tanks. The cycle of mix is also preset, and the actual batching takes place at the touch of a button.

Which of these features will improve your batching operation? Do you want remote control—for instance, batching from an air-conditioned office? Do you want the fast programming feature—for the occasional single batch from a different formula? Do you want the automatic cycling—that will duplicate the batch again and again at the touch of a button?

The Batchetron is . . . Fairbanks-Morse electronics instrumentation plus accurate weighing in the Fairbanks-Morse tradition. There is a new bulletin, No. ED-14, on the Batchetron with many suggested applications which may fit your process operations. Send for it today. Fairbanks, Morse & Co., Dept. P-9, 600 South Michigan Ave., Chicago 5, Illinois.



Batchetron control console.

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NEW

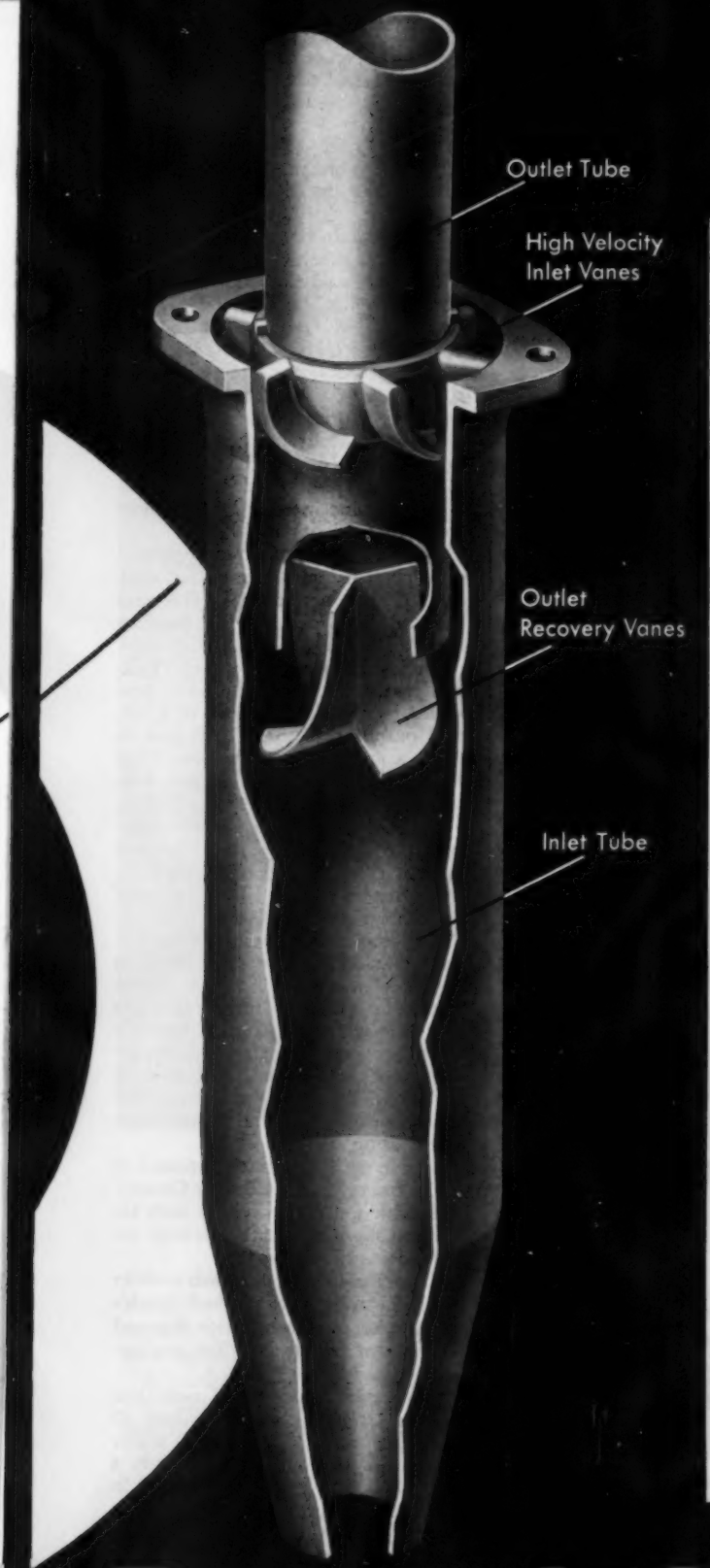
Cyclo-trell

Multiple Tube Dust Collector

Here are a few brief facts on Research's new multiple tube mechanical collector.

- Collection efficiencies are higher, for a given pressure drop, than other conventional multiple tube collectors.
- Gas flow per tube is higher than conventional units. This means fewer tubes per collector and lower total cost for a given capacity.
- Cyclo-trell's design is based on Research's 45 years experience in manufacturing gas cleaning equipment. As the largest manufacturer of electrical precipitators in the world, Research-Cottrell has engineered and built many combination units consisting of precipitators and mechanical collectors.
- Bulletin M gives complete details on design features, efficiency, capacity and detailed dimensional drawings. Write for your copy today.

RC168



Higher Collection Efficiency

An important reason for Cyclo-trell's higher collection efficiency is the aerodynamically shaped inlet vane unit. The purpose of these vanes is to produce a fast spiral of incoming gas. The faster these gases spin, the greater the centrifugal force on the suspended dust.

After testing many types and curvatures of vanes, Research found that this new design resulted in less turbulence, greater centrifugal force and higher collection efficiencies.

Greater Gas Handling Capacity

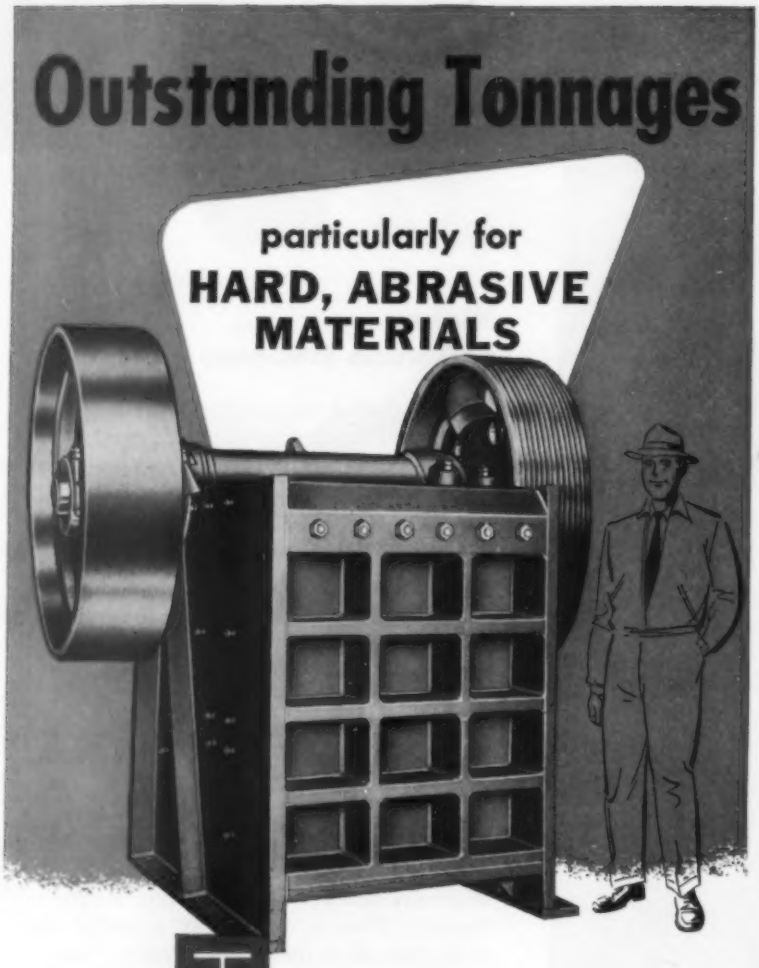
To develop a higher gas flow capacity than other multiple tube collectors, Research's engineers developed the following design features. First, by using a 10″ diameter inlet tube, instead of the conventional 9″ tube, the flow of incoming gas was increased.

The next step was to straighten the gas flow as it entered the outlet tube, since a spiraling gas stream creates more resistance than a straight through flow. In the Cyclo-trell this spiral is eliminated, and energy is recovered in the outlet tube by the Outlet Recovery Vanes. By positioning these vanes below the tube, rather than inside the tube, resistance has been further reduced.

This combination of features means greater gas flow per tube, fewer tubes per collector and a lower total cost for a given capacity and efficiency.

Research-Cottrell, Inc.

Main Office and Plant: Bound Brook, New Jersey • 405 Lexington Ave., New York 17, N. Y.
Grant Building, Pittsburgh 19, Penna., 228 No. La Salle St., Chicago 1, Ill. • 111 Sutter Bldg., San Francisco 4, Cal.



NEW McLANAHAN JAWMASTER CRUSHERS

With force-feed action and long jaw design, these high-capacity, all steel Jawmasters feature roller bearings throughout. There are thirteen models—ranging from 10 x 16 to 40 x 48, with capacities up to 750 tons per hour.

Write for Bulletin JM-56.

McLANAHAN AND STONE CORPORATION
253 Wall Street, Hollidaysburg, Pa.
McLANAHAN
Manufacturers — Founders — Machinists
Sales Offices in Principal Cities of the United States
Pit, Mine and Quarry Equipment Headquarters Since 1835

1955 Mineral Output

(*From page* 148)

the total value; and mineral fuels, $51,175,000, or 16 per cent of the total value.

Utah remained the only producer of natural gilsonite in the United States and ranked second in production of copper, gold, and molybdenum.

Utah continued to be an important producer of uranium, principally owing to the activities of several large producers. By-product-vanadium output reached 1,100,000 lb. in 1955, compared with 1,077,806 lb. in 1954. Production of recoverable zinc increased 7,669 short tons (23 percent) in 1955.

Two cement companies reported an 8 percent increase in output over the 1954 production total. This gain resulted from accelerating building activity.

Halloysite, shale, fire clay, Fuller's earth, and bentonite were produced by the clay industry of Utah, and output rose to 300,000 tons in 1955, a gain of 8 percent over 1954. Fluorspar production nearly doubled the 1954 total.

Sales of gypsum used in the manufacturer of plaster products and cement continued to climb in 1955, registering a gain of 14 percent over the 1954 figure.

Building and chemical lime output remained at the same level as that reported in 1954. Quicklime continued to be the most important lime product and was utilized mainly in ore concentration and metllurgical processes. A small quantity of hydrated lime was produced and used for ore concentration and water purification.

Crude perlite output continued to come from a mine in Beaver County.

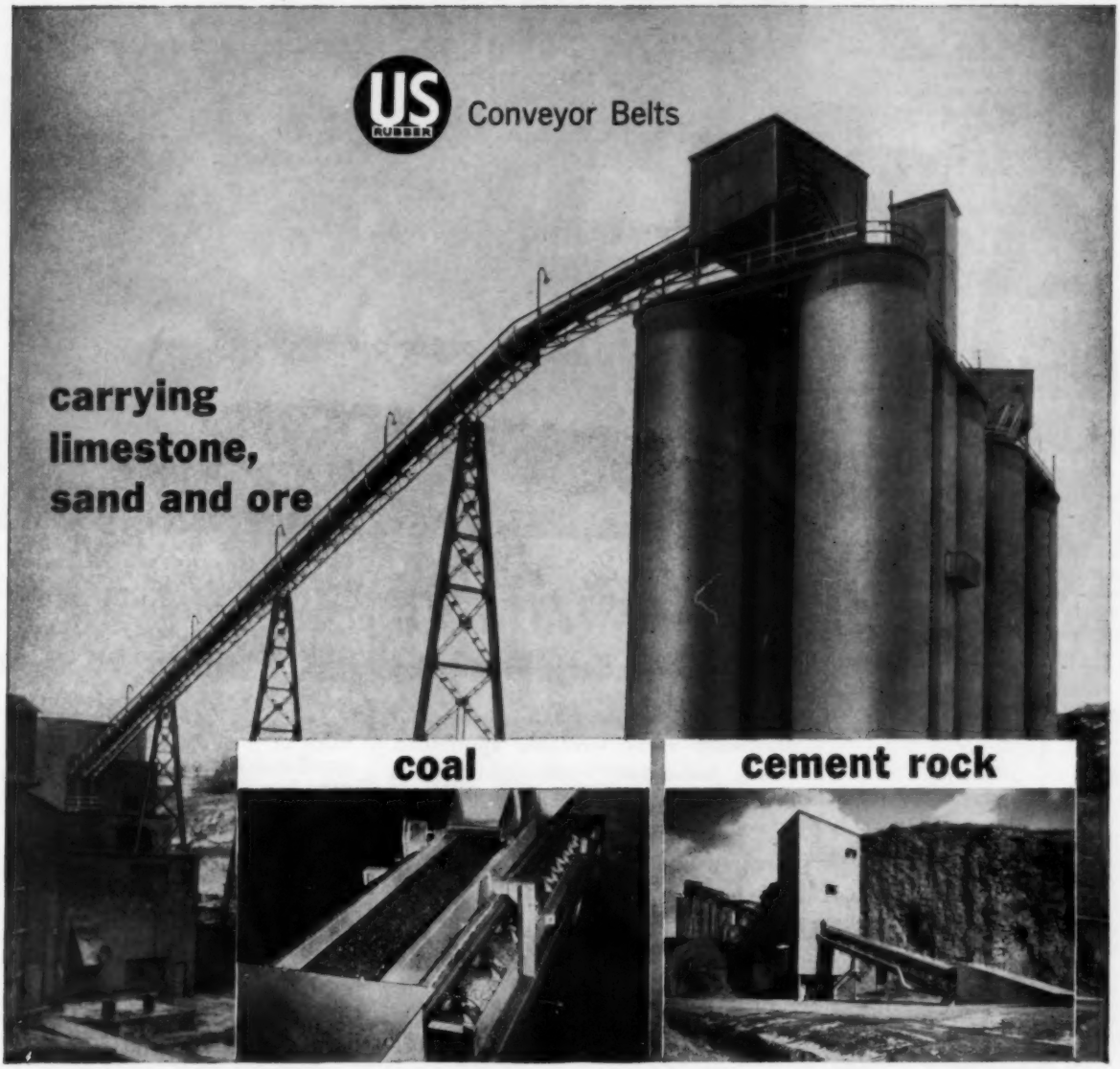
Production of phosphate rock increased slightly over the tonnage reported in 1954.

A strike during the last quarter of 1955 adversely affected Utah's production of potash, which dropped 28 percent below the 1954 production total.

Two mines—one in Tooele and one in Utah County—produced all the pumice in the state. The major portion of the output came from a pit near Cedarfork and was used in the manufacture of concrete block.

The increasing demand for salt brought about a significant expansion program in this industry. Output increased 8 percent over 1954.

Total output of sand and gravel in 1955 rose to 5,600,000 tons, a 5 percent gain over 1954. Again in



it's 100% "U. S." Belting in this cement plant's new raw-materials handling system

When this Pennsylvania cement plant expanded its raw-materials handling system, it chose U. S. Conveyor Belts exclusively. Experience had proven that "U. S." belts would give the required service and economy.

A total of ten "U. S." cotton-nylon (styles EN and XN) conveyor belts carry the wide variety of materials used in the manufacture of the cement.

Each belt, of course, was designed for its particular job. The entire installation is a good example of Three-Way Engineering, a "U. S." technique which has always proven successful on thousands of materials handling jobs, big and small. In Three-Way Engineering, "U. S." engineers work hand in hand with the designers of the conveyor system and the engineers of the operator. This method makes sure of the right belt for the right job.

Any belting problems can be solved by factory-trained engineers of the 28 "U. S." District Sales Offices. Or write us at Rockefeller Center, New York 20, N. Y.

US RUBBER

Mechanical Goods Division

United States Rubber

SYNTRON

VIBRATING SCREENS

VIBRATING SCREEN

For Every Screening Problem

GRIZZLY BAR SCREEN

SCREENING FEEDER

Built for Fast, efficient Heavy duty Screening

Syntron designs and builds screens for practically every screening application in many industries — mining, chemical, food, etc. Replaceable screening surfaces from 80 mesh to ¾" openings.

PULSATING MAGNET SCREENS—provide effective low cost sizing of medium tonnage materials.

GRIZZLY BAR SCREENS—increase efficiency of any operation requiring scalping or coarse screening of heavy tonnage materials.

SCREENING FEEDERS—utilize powerful electromagnetic drives to size, dewater, desludge, desilt, dedust bulk materials. Screens up to 3" material size.

Other SYNTRON Equipment of proven dependable Quality

WEIGH FEEDERS

For controlled accurate feeding by weight. Load variations corrected automatically.

SHAFT SEALS

Self - lubricating, mechanical seals for rotating shafts. Provide positive sealing of gases and liquids. Corrosion resistant.

FEEDER MACHINES

Complete with storage hopper, vibrator and feeder. For controlled feeding of bulk materials.

HOPPER LEVEL SWITCH

They automatically maintain desired maximum and minimum level of materials—never an empty bin or hopper.

Write today for complete catalogue—FREE

SYNTRON COMPANY

385 Carson Avenue Homer City, Penna.

1955, paving sand and gravel accounted for a little over half the total output.

Production of the various types of stone was 6 percent more than in 1954. Crushed limestone was the most important individual stone in this group and was used for fluxing purposes, for concrete aggregate, for sugar refining, as a dust for coal mines, and for riprap.

Coal was by far the most important of the mineral fuels, and the value ($43,373,000) represented 13 percent of the state's total mineral value and accounted for 85 percent of the value of all mineral fuels. Production increased from 5,616,000 tons in 1954 to 7,530,000 tons in 1955, a gain of 34 percent.

Utah's crude-petroleum output has been increasing each year for the last several years, and a gain of 232.000 bbl., or 12 percent, over 1954 was reported. Production of natural gasoline from Utah's 4 natural-gasoline cracking plants kept pace with the increased activity in crude-petroleum and natural-gas industries.

Colorado—For the ninth year in succession, a new record high in value of total mineral output was established in Colorado. Substantial gains in production of mineral fuels, especially petroleum, pushed the total value in 1955 to $272,764,000, or 12 percent above that of 1954.

Mineral fuels as a group accounted for 60 percent of the total value, and petroleum alone accounted for 50 percent of the total. All mineral fuels made substantial gains in both quantity and value of output, and the gain in coal is noteworthy as reversing a trend of declining production during recent years. Coal ranked second in the mineral-fuels group and third among all minerals in the state in value of output.

Although production of metallic minerals in terms of recoverable metal was less for most metals in Colorado during 1955, prices received for metals produced were generally higher, and the total value decreased less than 1 percent. Production of vanadium and columbium-tantalum concentrates increased, while output of other metals either remained stable or decreased moderately as compared to 1954. Molybdenum continued to lead the metals in value of output, and ranked second to petroleum among all minerals.

Value of the output of nonmetallics gained 9 percent over 1954, and accounted for 10 percent of the toal value of mineral production in Colorado. Increases were recorded in

One of the nation's major sources of titanium, this open-pit has produced 15,000,000 tons of ilmenite-magnetite ore and 8,700,000 tons of concentrates since its start in 1942. Over 17,000,000 tons of rocky overburden have also been removed. Entire deposit is 1800 ft. long, 900 ft. wide; averages 35% magnetite, 32% ilmenite, 10% feldspar and 23% iron silicates. All ore and waste must be shot...drill holes are sunk with a 42-T churn drill using a 9 inch bit, to 39 ft. deep. From 350 to 500 lbs. of 90% gelatin dynamite are used per hole...each lb. breaks up 3½ tons of waste and ore. A 4-yd. shovel, together with four 22-ton rear-dump trucks, loads all waste ...two 2½-yd. shovels, together with seven 15-ton trucks, move the ore. Finished ilmenite goes to processing plants, for conversion into titanium dioxide pigments for paints, paper, rubber, ceramics, and other substances. Magnetite concentrate is both converted to sinter and shipped raw to various iron, steel, refractory, and cement plants.

How rubber-tired tractors cut costs for one of world's largest titanium mines

In the heart of the Adirondack Mountains in upper New York State lies a mine which is one of the world's largest producers of titanium. From a pit 900 ft. x 1,800 ft. comes 3,200,000 tons of ore and waste yearly. Two rubber-tired Tournatractors shuttle back and forth to handle tractor work at pit, stockpiles, and plant.

1 tractor cleans around 3 shovels, 1 dropball, 11 trucks

One of these 17 mph 208 hp units is assigned mainly to pit and dump clean-up. At the pit, it cleans around *two* 2½-yd. shovels, *seven* ore-hauling trucks, *one* 4-yd. shovel, *and* a rubber-tired dropball crane. At the dump, a mile away, it cleans up for a fleet of 4 end-dump trucks. Rig shuttles continuously between assignments. A 300 ft. trip between shovels takes as little as 20 seconds ...the mile from pit to dump takes 3 to 5 minutes. Despite this busy schedule, tractor finds time to move air compressors, drills, and other pieces of pit equipment.

Another dozes magnetite weighing 4800 lb./yd.

The second Tournatractor is used primarily on the magnetite stockpile. Here it dozes concentrate within range of clamshell that loads railroad cars, or else dozes directly into a hopper. Rig's blade often carries 2½ cubic yards of material — weight *6 tons!* When needed, this tractor moves to other stockpiles to doze ilmenite concentrate or coal. Occasionally, it spots railroad cars in the sintering plant area. As needed, it cleans spillage from roads and haulage ways, and does other odd jobs. Wherever it goes, rig's low-pressure tires do no damage to footing. They roll easily over pavement, railroad tracks and ties.

Each costs $1 less per hour to operate than crawler-tractors

On shovel clean-up jobs, owners report Tournatractors outproduce the biggest crawler-tractors, 2-to-1. Units usually work at higher speeds and move job-to-job at higher speeds. Tournatractors cost less to maintain, too...4 tires eliminate the headaches of 500 to 600 track parts. Lowered maintenance, plus lower repair and operating costs are proved by accurate figures kept by the mining company. These show cost to operate Tournatractor "averages" approximately *$1.00 less per hour than their records of average cost for crawler-tractors.*

You judge its advantages

Tournatractor's lower costs, "go-anywhere" mobility, and fast-working speeds can pay off for you, too! Ask your LeTourneau-Westinghouse Distributor for a demonstration of this versatile machine so you can judge its advantages for yourself!

Tournatractor—Trademark Reg. U.S. Pat. Off. T-752-M-bw

▼ Dozing stockpiled magnetite, Tournatractor moves up to 2½ bank yards (about 6 tons) per push.

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

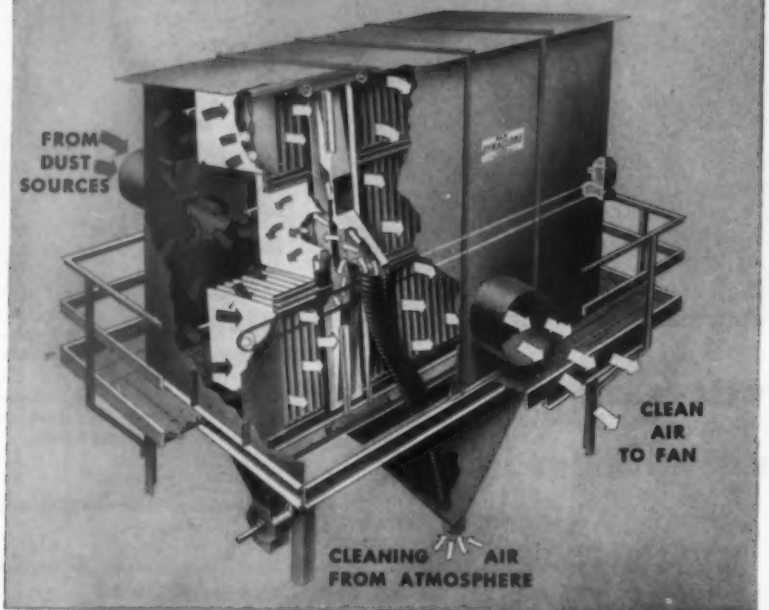
A Subsidiary of Westinghouse Air Brake Company

ARBA See you at the ROAD SHOW • Chicago • January 28-February 2, 1957

SLY DYNACLONE®

(PATENTED)

FOR CONTINUOUS DUST COLLECTION



PROVEN IN USE IN HUNDREDS OF PLANTS

The first reverse air cleaning unit produced in the United States, the Sly Dynaclone has proven during the past six years that it is the most efficient dust filter ever made. It operates continuously — reclaims *all* the dust to keep plants clean. Thus, valuable material is saved, worker comfort and efficiency improved, cleaning and maintenance costs reduced. The *original* self-cleaning dust filter, the Dynaclone is manufactured by Sly, pioneer and leader in dust collection equipment and original patentee of the cloth-type filter.

HOW IT WORKS

Dust-laden air is drawn in from dust sources . . . diffused into dust chamber by baffle plate . . . drawn through fabric of filter bags and cleaned. Clean air passes out the case and into suction fan. Concurrently, traveler moves back and forth across dust wall, registering successively with one bag at a time. Suction existing in the dust chamber draws atmospheric air through the bag in reverse direction, cleaning the bag.

MANY IMPORTANT ADVANTAGES

- Constant suction at dust sources
- Self-cleaning for continuous operation—no mechanical shaking
- No auxiliary motors or blowers—the main operating fan does the cleaning
- No abrasion of bags by the cleaner—minimum maintenance
- Compactness for space-saving installation
- Advanced design for ease of installation

WRITE FOR FREE DYNACLONE BOOKLET

THE W. W. SLY MANUFACTURING CO.

SINCE 1876

4745 TRAIN AVENUE • CLEVELAND 1, OHIO

OFFICES IN PRINCIPAL CITIES

production of clay, gypsum, cement, peat, sand and gravel, stone, and perlite; and decreases were noted in feldspar, fluorspar, mica, and vermiculite. Output of pumice, carbon dioxide, and gem stones remained at or very close to 1954 levels.

Pegmatite deposits worked for beryl, feldspar, and other minerals yielded 45 tons of hand-sorted beryl concentrates, a decrease of 25 percent. Columbium-tantalum concentrates sold in 1955 nearly doubled the 1954 figure.

Output of recoverable metal declined for four metals of the five-metal group including gold, silver, copper, lead, and zinc; the exception was zinc, which showed a very small increase of 1 percent. Compared to 1954, gold production decreased 6 percent, silver production 18 percent, copper production 5 percent, and lead production 11 percent.

Although Colorado's three cement plants operated at optimum capacity during 1955, shipments showed only a small percentage increase over 1954 figures.

Shale, fire clay, and bentonite were the only types of clay mined during the year, and mine shipments in 1955 showed an 8 percent gain over 1954.

The output of crude feldspar in 1955 fell 12 percent from the 1954 total. Increasing mining costs relative to the low average price of feldspar is considered the major cause of the decrease in production. Increased mining costs, a low domestic price, and imports can be credited for the 12 percent decline in fluorspar production. Nearly all of the state's small mines remained closed during the year.

Gypsum output was 8 percent greater in 1955 than in 1954. The increase can be attributed mainly to the larger demand for gypsum from the state's cement industry.

A small tonnage of lithium (lepidolite) was produced in Gunnison County. Scrap-mica output, mainly from pegmatite mines in Fremont and Gunnison counties, decreased 20 percent in 1955.

Pumicite and scoria production in 1955 remained at the same high level reported in 1954.

Structural and paving sand and gravel and crushed and dimension stone production continued at a high level in 1955.

For the first time in several years, the coal industry of Colorado experienced an increase in demand for its product, and shipments of coal in 1955 increased 18 percent over last year's figures. Natural gas, nat-

Here's how 6 owners cut costs with Tournapull Rear-Dumps

Huron Portland Cement Company, Detroit, formerly used a narrow-gauge railway system for hauling shale to their mill at Alpena, Michigan. To cut costs and speed the operation, they now have 2 LeTourneau-Westinghouse Model C Rear-Dumps doing the entire job.

2,700 tons daily on 1900′ cycles

In typical operation, a 3-yard shovel loads these Rear-Dumps with 18 tons of shale in 1¾ minutes. Despite adverse grades of 4 to 7% on the haul, each unit takes only 7 minutes to complete 1900′ cycles. The 2 haulers regularly deliver 13 to 14 loads (234 to 252 tons) per 50-minute hour. Company records show an average production per 11-hour shift of 150 loads (2,700 tons). This is enough shale to produce 30,000 barrels of cement daily, greatest output of any mill in the world.

It will pay you to try LeTourneau-Westinghouse Rear-Dumps, too. They are available in 9, 22, 35, and 50-ton capacities to fit your job. Get facts on performance . . . price . . . and delivery. Call us any time.

INDIANA LIMESTONE QUARRY
82,476 tons for 7.6c per ton

Dunn Limestone Co., Spencer, in 6 months hauled 79,923 tons of rock plus 2553 tons of limestone and fluxing stone with 2 "D's". Total costs for 1,932 hours were $7234 ($2760 wages; $3800 depreciation, insurance, taxes; $674 fuel, repairs). That's $3.74 per hour or 7.63c per ton hauled.

200,000-YD. W. VA. TUNNEL JOB
turns where trucks can't

Bates & Rogers Construction Corp., Chicago, teamed 2 D Rear-Dumps and 2 trucks to haul muck and shale for B. & O. railroad tunnel near Clarksburg. While trucks needed skid plate to turn inside 31′ wide tunnel, "D's" made 90° turns (in 12′4″ radius) and easily maneuvered under shovel.

CALIFORNIA MOUNTAIN QUARRY
tried 1... bought 2 "C's"

Monolith Portland Cement Co. tried this one Rear-Dump; liked it so well they bought 2 more for hauling rock from the cramped quarters of their mountain-face limestone quarry. Working at altitude of 3800′, each "C" carries 16 tons per load . . . makes five 400′ cycles every 50-min. hour.

OHIO CLAY QUARRY
moves 100 tons of rock hourly

At U.S. Quarry Tile clay pit, Contractor Adolph Bockus, Canton, hauls 100 tons of overburden hourly with his 122 hp "D" Rear-Dump. Rig carries 9 to 9½ tons per load. Haul speeds average 14 mph over a 700′ haul (which includes grades up to 20%). Output, 11 trips per 50-min. hour.

PENNSYLVANIA COAL MINE
3 "A's" take place of 10 trucks

Colitz Coal Co., Pottsville, uses 3 "A" Rear-Dumps in place of ten 12 to 15-ton trucks. These big rigs carry 40 to 51 tons of overburden per load up 20% grades; over 2000′ cycles, make about 50 trips each per 7½-hr. shift. Says Owner Colitz, "These units have cut operating costs 40%."

Tournapull—Trademark Reg. U.S. Pat. Off. R-601-Q-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

ARBA See you at the ROAD SHOW • Chicago • January 28-February 2, 1957

Remove 4 Bolts and there's the impeller! . . . no need to disconnect piping

MORRIS

TYPE RX

Slurry Pump

Write for specifications, capacities, performance charts, and other helpful information. Ask for Bulletin 185.

Morris Type RX is the slurry pump whose impeller can be removed without disturbing the suction and discharge piping or the bearings! To get at the impeller and renewable shaft sleeve, you simply loosen four outside clamping bolts—slip them out of disc slots—take off the end cover. Impeller unscrews from shaft threads; shaft sleeve is removed through end cover opening.

At no point do you have to dismantle the piping. Lay-up time costs are less . . . pump is back in service quicker.

Use the Morris Type RX in Your Mining Operations

Morris Type RX is the product of nearly a century of experience in designing and building materials-handling pumps. It is specifically engineered to handle mixtures containing ore concentrates . . . tailings, slag and residue from filters and classifiers . . . all types of caustic or acid mixtures containing abrasives or solids.

MORRIS CENTRIFUGAL PUMPS

MORRIS MACHINE WORKS
Baldwinsville, N. Y.
Branch Offices in Principal Cities

ural gasoline, and liquefied-petroleum gases all showed a substantial increase in production in 1955.

Petroleum production rose from 41,000,000 barrels in 1954 to 49,000,000 barrels in 1955, valued at $137,000,000.

Wyoming—The value of all minerals produced in Wyoming in 1955 (exclusive of uranium) reached $303,200,000, a 7 percent gain over the $283,570,000 total in 1954. This increase was attained despite a decline in coal output.

The mineral fuels continued to rank first in value of output, contributing 89 percent to the total value of the mineral wealth of Wyoming. Crude petroleum, with a 7 percent increase in production over 1954, accounted for 91 percent of the total value of all the mineral fuels. Natural gas and natural-gas liquids together showed a gain of 6 percent and accounted for 2 percent and 3 percent, respectively, of the total fuel value. Coal output fell to 2,610,000 tons in 1955, a drop of 4 per cent from the 1954 total.

Shipments of bentontite in Wyoming increased 6 percent in 1955, as compared to an 11 percent gain recorded in 1954; the average price based on the value reported by producers remained at the same level as that reported in 1954.

Trona (natural soda ash) retained its rating as the second most important nonmetallic mineral in Wyoming. Output of elemental sulphur was raised 6 percent in 1955.

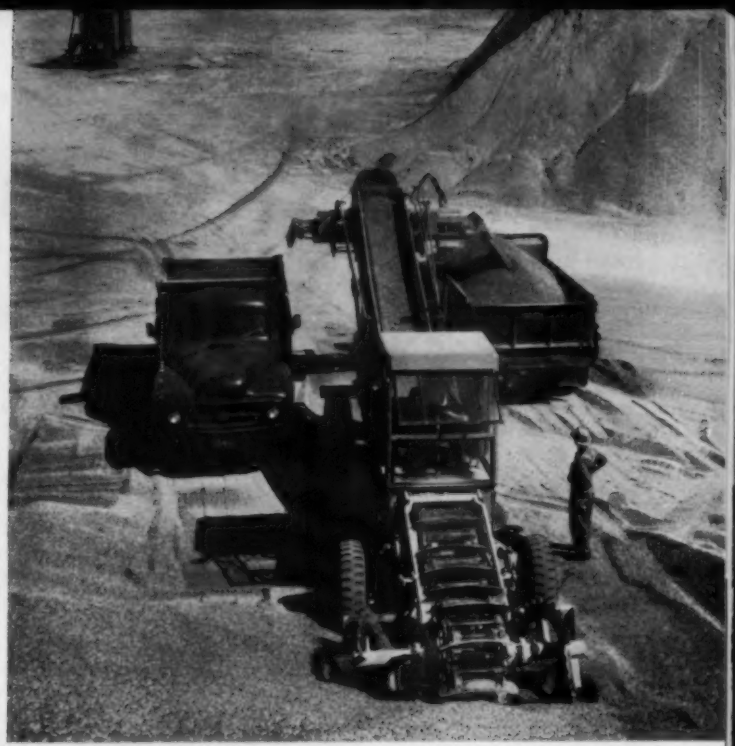
As a result of the accelerated building activity the Wyoming shipments of cement again showed a significant increase over 1954. The quantity of stone produced in 1955 also showed a slight increase and consisted mainly of crushed limestone for use in sugar refining and other crushed stone used for railroad ballast and in aggregate for construction of highways and buildings. Structural and paving sand and gravel maintained relatively the same level as reported in 1954.

Coupled with the increased output of cement, the production of gypsum used in the manufacture of cement increased one-third over the 1954 figure. Phosphate rock production showed a slight decline from the 1954 output.

Production of pumice and scoria for the concrete block industry increased slightly, whereas the utilization of scoria as railroad ballast remained about the same.

An estimated 2,500 lb. of canadium was recovered as a by-product from the processing of uranium ores.

Ohio quarry tells *how to speed up* YOUR loading operations!



As soon as TraveLoader loads one truck, cross-conveyor is shifted to opposite side by operator from the driver's cab. Loading continues into waiting truck without interruption.

TraveLoader moves forward in any one of several working speeds... revolving feeder places a continuous flow of material on conveyor belt... any size truck is loaded in seconds.

The Karch Stone Co., of Celina, Ohio, stepped up their loading when they added a self-propelled, belt-type TraveLoader to their fleet. Now, after months of tough loading to state, county, and private trucks, Company President George Karch reports, *"The TraveLoader loads twice as fast as bucket-type loaders."*

Loads 8-ton trucks in 40 seconds

At the Karch quarry, 18 to 20 different specification aggregates are handled everyday. Materials range from lime to 3" rock. Working in any of the material stockpiles, the TraveLoader loads 6½ yds. in about 40 seconds, according to Mr. Karch. Bucket-type loaders working in the same material were timed at an average of 99 seconds. Recently, after the TraveLoader moved 2300 tons of crushed stone in one day, Mr. Karch commented, *"No other loader compares with the TraveLoader."*

Cross-conveyor balances load

The TraveLoader's screw-type feeder automatically adapts itself to the load ahead and keeps a continuous flow of material moving on to the conveyor belt. Cross-conveyor (optional equipment) loads trucks on either side. In stockpile loading, no time is wasted waiting for trucks to get into an exact loading position. Cross-conveyor may be shifted to truck's position, either side, by hydraulic control from the cab. This flexibility of loading conveyor also makes it easy to balance truck loads sidewise. Optional deflectors on ends of cross-conveyor give better balanced loads in trucks of all sizes.

Operator's cab centrally located

When loading, the Traveloader's centrally located cab... up out of the dust... gives operator clear visibility in all directions. Operator has full vision of feeder screw, conveyor, cross-conveyor, and truck. Loading is uninterrupted. When one truck is loaded, operator shifts cross-conveyor and material pours into waiting truck at other side. No front-end loader (with its lost motion in truck to truck turn-and-travel motion) can match the ease of operation, and fast loading obtained with TraveLoader. Find out how this rugged loader can cut delays on your loading, increase your loading capacity, decrease your loading costs. Ask your LeTourneau-Westinghouse Distributor for complete specifications.

AL-13-M-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

ARBA See you at the ROAD SHOW • Chicago • January 28-February 2, 1957

South Dakota — Mineral production in 1955, exclusive of uranium, was valued at $38,618,000, a record high for the state. Nonmetallic minerals contributed 51 percent of the total mineral value, with sand and gravel, stone, cement, and clay among the most important commodities in this group in terms of value. Of the metallic minerals, which represent 48 percent of the state's total mineral value, gold accounted for 98 percent of the total metal value, silver 1 percent, and beryl, columbium-tantalum, and vanadium the remainder.

The value of structural and paving sand and gravel output in 1955 was $8,200,000 and accounted for 42 percent of the total value of the nonmetallics.

Total stone production increased 11 percent in 1955 and accounted for 27 percent of the value of all nonmetallic minerals. In terms of quantities, crushed limestone and sandstone continued to be the most important stone produced.

Cement ranked as the third most important nonmetallic and contributed 20 percent of the total value of nonmetallic minerals.

Clay was produced in Butte County in the northern Black Hills. Shale was produced for use as a lightweight aggregate and in the manufacture of cement. Clay accounted for 7 percent of the total value of all nonmetallics.

Feldspar production decreased slightly in 1955. Production of mica, both sheet and scrap, decreased 13 percent from 1954. Gem stones, consisting principally of rose quartz and feldspar sold as specimens, were produced in Custer and Pennington counties.

North Dakota — Petroleum again ranked as the most important mineral in North Dakota in 1955, with a record production of slightly more than 8,000,000 barrels, an increase of 36 percent over 1954. Largely because of this marked increase in petroleum output, the value of all minerals produced in North Dakota during the year (exclusive of uranium) reached $26,293,000, a 20 percent gain over the $21,847,000 total reported in 1954.

Sand and gravel, the third most valuable mineral commodity in the state, increased slightly over 1954. A small quantity of shale and bentonite was mined by three prodcers. The shale was used in the manufacture of building brick and heavy clay products. Crushed stone was produced in small quantities for road construction and maintenance.

Legal Decisions

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

Written Contract Held Void

Discussion has arisen frequently over the legal question: "Is a written contract always enforceable by the contracting parties?"

The answer is: A written contract is void which does not express the original intentions of the contracting parties.

For example, in *Asphalt Paving Company v. Githens,* 271 S. W. (2d) 374, the testimony showed facts, as follows: The Asphalt Paving Company signed a written contract with a general contractor to furnish asphalt concrete for the runways of a municipal airport. The Asphalt Paving Company delivered 1,289.91 tons of asphalt, and according to the written contract there is still due and unpaid $4,656.90 for the asphalt.

In litigation the contractor alleged that there was a mutual mistake in the drawing of the contract, and the agreed price was not $10 per ton as stated in the contract but $1 per sq. yd.

The higher court held that the testimony proved that the contractor originally intended to deliver the asphalt at $1 per sq. yd., saying:

"Under the evidence in this case the undisputed evidence is that the contract originally made was to be $1 per sq. yd. for asphalt pavement furnished. The written contract was a different one from that intended by the parties. It recited that defendant (contractor) was to pay $10 per ton."

For comparison, see 17 C.J.S. Contracts, 142 page 495. The law stated:

"A writing is not a contract when it fails to express that on which the minds of the parties met, and courts freely exercise the power to correct mistakes when the proof leaves no doubt that the real contract was something else. A mistake of expression occurs where the parties are of the same mind regarding the terms of the agreement, but the writing intended to embrace those terms does not express their true meaning."

Therefore, it is quite apparent that a written contract is not valid and enforceable if the testimony indicates that the obligations therein were not originally intended by the contracting parties.

Deed Broadly Construed

In answer to the question: "Is a deed always construed strictly in accordance with the plain meaning of the written words used in the deed?" the answer is yes, if the original intentions of the contracting parties are not violated.

For illustration, in *Ozark Black Marble Company v. Stephenson,* 186 S. W. (2d) 145, it was shown that a property owner gave a "stone deed" to the Ozark Marble Company. The latter company agreed to pay the property owner $100 per acre for all land "used" in quarrying. The company spent about $4,000 in testing, sawing, polishing samples, surveying, and promotional work. Notwithstanding these expenses, the company did not succeed in selling the marble at a profit, and litigation developed over payments to the land owner where "only small parts" of the land was used.

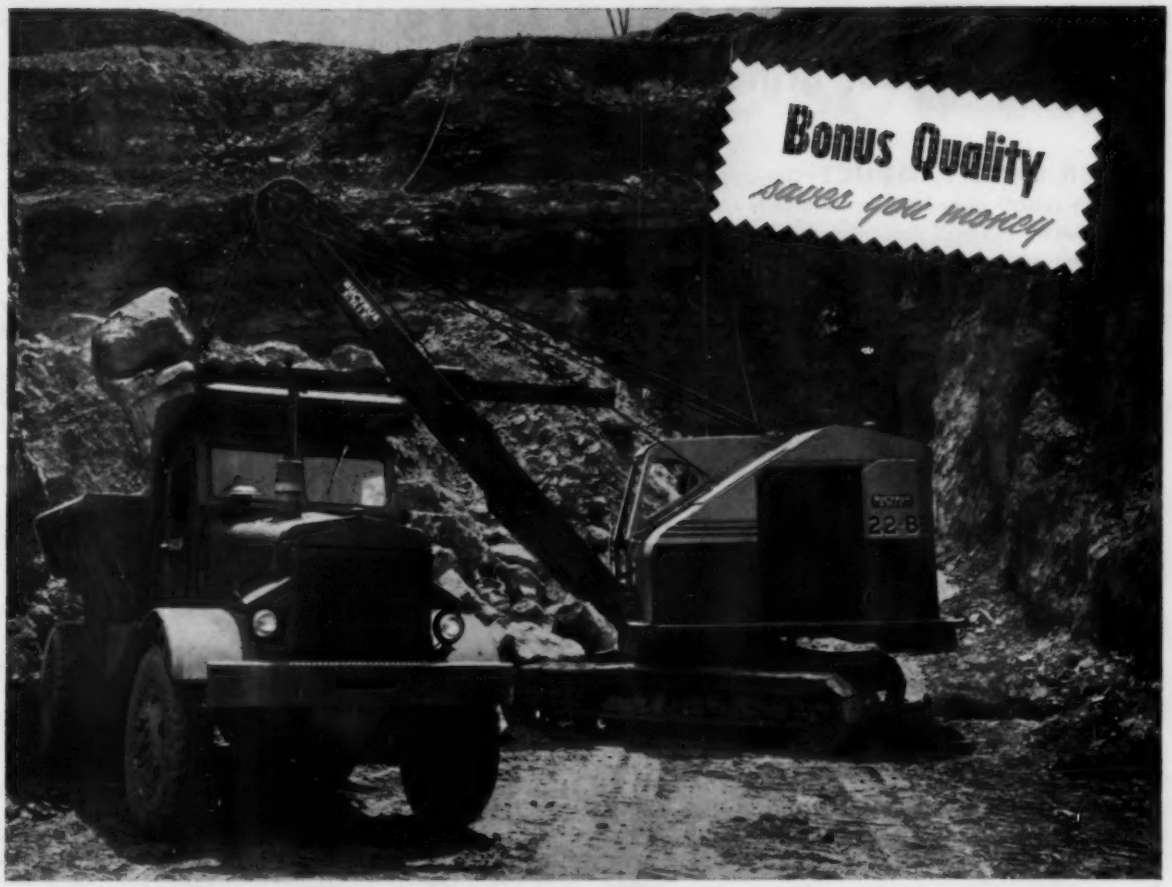
The higher court held that the company must pay $100 for each acre on which any work was done.

Hence, in this case since the written original contract plainly stated that the marble company would pay the property owner $100 per acre for all land "used" in quarrying stone, and no testimony was given that a prior verbal agreement differed, the property owner was entitled to only $100 per acre for the land used.

Liability for Tax Payments

This query came from another reader: "Recently the state sued me to collect taxes. Several years ago I started my brother in the sand and gravel business and advanced the necessary capital. Now, the state claims I am liable for payment of taxes against the business. Is this so?"

The answer to this question depends on the answer to this question: Did you control your brother and the sand and gravel business? If so, you are liable for payment of the taxes. On the other hand, if your brother had control of the employees and also operated the business according to his own ideas, the brother is liable for payment of these overdue taxes. In other words, the courts hold that one who "controls" a busi-



High-speed work cycles are a big reason why quarry owners like the 22-B. This one loads limestone in Iowa.

Quarry profits begin in the pit --where Bucyrus-Eries are favorites

Profitable quarry operations depend on sustained high output and low cost . . . Bucyrus-Erie excavators have a reputation for offering both.

High output comes from fast work cycles. Controls are instant-acting and respond to fingertip touch. Balance between power and speed helps operators maintain a fast, effortless pace throughout an entire shift.

Bucyrus-Erie machines not only work fast; they keep working steadily with little time out for maintenance. Special care has been taken to arrange machinery so it's easy to get at for lubrication, adjustment, and parts replacement.

Bucyrus-Eries also offer long service life — another result of engineering, research and manufacturing facilities that are unsurpassed in the industry.

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

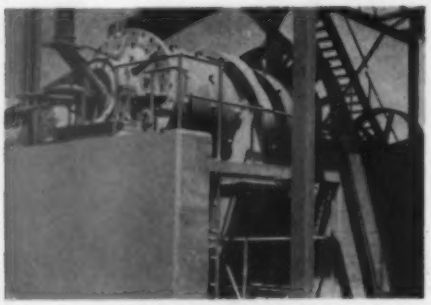
Your Bucyrus-Erie distributor will be glad to give you all the details on shovels and draglines from ⅜- to 4-cu. yd.

246E56

Bonus Quality is the result of extra care in Bucyrus-Erie manufacturing — like the carefully controlled flame-hardening of the lower path for the hook rollers by this automatic machine to insure long life and low maintenance.

MARCY SPECIAL CPD MILLS for grinding specification sands

BETTER SAND PRODUCT—Grinding in a Marcy CPD Mill produces a uniformly cubical shaped product with same characteristics of shape and strength throughout the range of sizes produced. This results in:



Typical installation of Marcy Center Peripheral Discharge Mill.

- **stronger concrete**
- **better finish on concrete**
- **better slump characteristics**
- **use of less cement**

OPERATING ADVANTAGES—Compared with crushing, experience has proved these additional advantages of grinding by Marcy CPD Mills:

LOW COST...low maintenance, less steel consumption and less power per ton result in an overall cost generally less than 25c per ton, exclusive of ammortization.

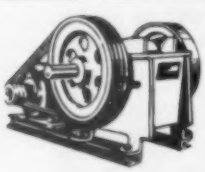
CLEANER OPERATION

FLEXIBILITY...by varying rate of feed, pulp dilution and discharge port area it is possible to change gradation of finished product to meet different specifications.

WET OR DRY GRINDING
Capacities from 2 to 200 dry tons per hour.

MASSCO-GRIGSBY RUBBER OR NEOPRENE PINCH VALVES
Designed for abrasive and corrosive pulps. Patented hinged sleeve for longer wear. 1" to 14" diameter. Up to 150 lbs. continuous pressure.

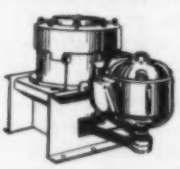
MARCY PULP DENSITY SCALE
Gives *Direct Reading* of weight of sample in grams or kilograms; specific gravity of liquid, specific gravity of pulp; percent solids contained in a pulp of any given specific gravity; specific gravity of dry solids. Is very accurate and easy to keep clean.

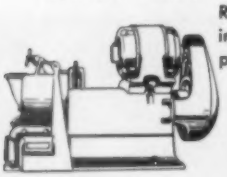


LABORATORY EQUIPMENT

4" x 6" MASSCO LABORATORY JAW CRUSHER
Welded steel frame; manganese steel jaw and check plates; bronze bushed bearings; smooth jaws give better product and easier cleaning. Adjustment for plate wear and product size by convenient hand wheel.

MASSCO GY-ROLL REDUCTION LABORATORY CRUSHER
Reduces ½" feed to as fine as 10 mesh in single pass. High capacity with low power consumption. 6" and 10" sizes.





MASSCO-McCOOL PULVERIZERS
Disc type grinder with planetary movement. No gears. Will grind from ¼" to 150 mesh in one pass.

The Mine & Smelter Supply Co.

DENVER • SALT LAKE CITY • EL PASO • NEW YORK

Representatives in Foreign Countries

WRITE FOR COMPLETE DATA

ness is the "employer", and therefore liable for payment of taxes.

For illustration, in *State v. Dean*, 188 Pac. (2d) 355, the testimony showed these facts: One Dean permitted the use of his credit rating to assist his relatives in organizing and opening a quarry. An auditor for the state made an audit of the books of the business, and prepared reports. Dean signed these reports because of the absence of the relatives.

The state sued Dean to recover payments of various taxes, among them taxes under the State Unemployment Act. The state contended that Dean was the real owner and employer of the business and that his relatives were mere employees.

The evidence tending to place Dean in the position as owner of the business was the fact that the two reports prepared by the auditor of the state were signed by Dean.

Under these circumstances the higher court held that Dean was liable for payment of overdue taxes.

Purpose of Iniury Compensation Laws

All courts agree that the purpose of the State Workmen's Compensation Act is to provide injured employees with funds to subsist on until they can return to profitable work. Hence, a majority of courts, although not all, hold that an employee who earns more money after an injury than before the injury cannot expect payment of compensation under the State Workmen's Compensation Act.

For example, in *Boulanger v. Liberty Mutual Insurance Company*, 31 So. (2d) 888, it was shown that one Roger injured his arm while attending to his regular work, which necessitated the amputation of the arm. Four months after the accident Roger applied for compensation under the State Workmen's Compensation Act. The employer contested the suit and proved these facts: Before his injury Roger earned approximately $2,500 per year. His earnings since the accident averaged $3,002 per year.

Since Roger's income was more after the accident than before, the higher court refused to award compensation for loss of his arm. This court said:

"In the present case the record abundantly shows, beyond any doubt, that Roger is capable of carrying on substantially and efficiently his duties and is performing his work in a satisfactory manner."

Of course, the outcome of this legal controversy was resolved upon the provisions of laws of the state in which the suit was filed. There are

LINK-BELT offers you COMPLETE, ONE-SOURCE SERVICE

for all your screw conveyor needs

Positive flow of material to storage bin is provided by this 12-in. diameter Helicoid screw conveyor (cover removed for photo).

How this 4-phase service saves you time . . . spares you details

1. **ANALYSIS AND ENGINEERING** service is provided by a district sales office in your area. From long experience, Link-Belt District Engineers can quickly ascertain the best conveying arrangement for you.

2. **COMPLETE LINE OF SCREW CONVEYOR COMPONENTS** and related elevating, conveying and power transmission equipment is your assurance that specific needs will be fulfilled most efficiently and economically.

3. **EASY ERECTION** is achieved because of prefitting, match marking, close-tolerance manufacturing and Link-Belt drawings. Link-Belt will handle entire erection assignment if you wish.

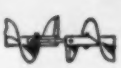
4. **SATISFACTORY PERFORMANCE** is assured when you rely on Link-Belt as a single contract source for your complete system. We will accept full responsibility for placing it in operating readiness.

SCREWS

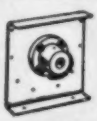
HANGERS

TROUGHS

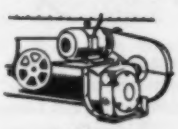
SPOUTS & GATES



SHAFTS & COUPLINGS



TROUGH ENDS



DRIVES

Here's a four-point program that provides quick and easy answers to your screw conveyor problems whether minor or complex. Whatever you need in components . . . and to whatever extent you require engineering supervision—Link-Belt will devise a system "tailored" to your requirements, correlating all factors to assure you of finest performance. For more facts, call your nearby Link-Belt office.

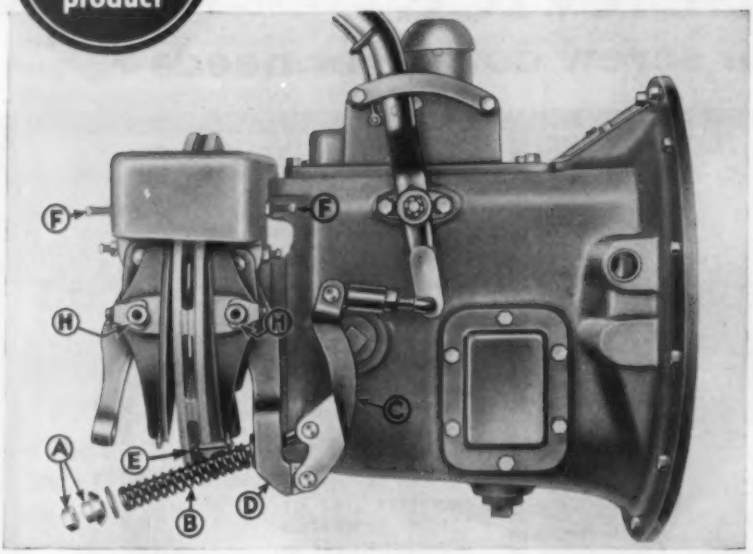
LINK-BELT

SCREW CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13,913

an ACCO product

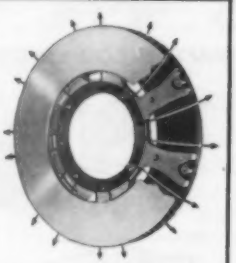
It Pays to Specify TRU-STOP Brakes



How TRU-STOP Brakes save more money than they cost!

TRU-STOP performance in just one emergency may more than offset any additional first cost. But their true economy shows up when it comes time to adjust or reline.

TRU-STOP brakes are adjusted and relined *without dropping the drive shaft.* Both are quickly and easily done with only a few simple tools. Down time is reduced to a minimum.



Longer Lining Life

• The terrific heat generated in braking cuts lining life. TRU-STOPS quickly dissipate this heat. Most of the disc is exposed to the air even during braking. And a cooling jet of air circulates through the disc, prolongs lining life.

See how easily adjustment is made
(illustration above)

1 Tighten nut A so that spring B exerts enough pressure to bring lever C to stop solidly against lever arm D.
2 Insert 1/32" shim between front shoe lining and disc and adjust pull-rod to maintain this clearance, first being sure to have hand-lever in full release position.
3 Further tighten nut A so that rear shoe lining is firm against disc but so that shim in front can still be removed. Remove shim.
4 See that tension spring E is in place, then adjust screws F so that linings are parallel with disc.

See how easily relining is accomplished

1 Remove nut A.
2 Remove spring E.
3 Apply hand lever so that rear arm can be swung back clear of tie rod and spring.
4 Remove shoe pin locks H, and drop shoe.
5 Replace relined shoes and adjust as per instructions.

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records of other higher court decisions in various states, where the laws do not exempt injured employees, that such employees who earn more wages after an injury, may still receive lawful compensation under specific provisions of the State Workmen's Compensation Act.

Insurance Must Be Paid

It is well established law that an insured person or corporation who violates the terms of an insurance policy cannot collect a loss from the insurance company. However, according to a late higher court decision, an insured company keeps "verifiable records of all property covered by this policy", if at the end of each year an itemized inventory is taken of stock on hand, and this record is preserved, together with invoices covering all subsequent sales and purchases.

For illustration, in *American Mutual Liability Insurance Company v. Howard Company,* 228 Fed. Rep. (2d) 550, it was shown that a corporation held an insurance policy which required the corporation to keep "verifiable" records of all property and merchandise covered by the policy as a protection to the insurance company against fraudulent claims. The policy covered dishonesty of employees, loss of money and merchandise within the premises, and loss of money and securities outside the premises.

The testimony showed that certain of the corporation's truck drivers would load merchandise, not covered by invoices, then sell it to dishonest retailers and keep the proceeds.

The insurance company refused to pay the loss on the contention that the corporation had failed to keep the records required by the policy. The corporation proved that it made an annual inventory, together with invoices covering all subsequent sales and purchases. It is interesting to observe that the higher court held that the insurance company must pay the loss, saying:

"Certainly the keeping of the annual inventories with invoices of subsequent purchases and sales was the keeping of 'verifiable records'. The evidence is that from these it was possible to determine at any given time what goods were on hand, although this would require labor and expense."

Control Is Important

The higher courts have in the past very consistently held that one who has control over the ordinary driver of a motor truck is responsible for the negligence of the driver. Last month a higher court upheld this

HOW NEW NO. 955 TRAXCAVATOR* CAN STEP UP YOUR PRODUCTION

This new CAT* No. 955 Traxcavator loads a 5-yd. hopper car with brick clay in about 1½ minutes. Redford Brick Co. of Richmond, Va., bought it because of excellent service rendered by their other Caterpillar equipment.

The new Caterpillar No. 955 is built to handle more material at lower cost than ever before. Its 1½-yd. bucket is matched to its rugged, 70 HP Caterpillar Diesel Engine and 21,500-lb. weight for top efficiency and ground-hugging traction.

Compact, maneuverable and easy handling, the new No. 955 Traxcavator has such advanced features as these: 40-degree bucket tip-back at ground level for more leverage, less spillage. Exclusive oil clutch for reduced maintenance, longer clutch life, easier shifting for the operator. Balanced hydraulic system for full volume and pressure over thousands of hours' operation. In-seat starting, conveniently placed controls and excellent visibility for peak operator efficiency.

There are now three Traxcavators in the new Caterpillar line: the 1-yd. No. 933, the 1½-yd. No. 955 and the 2¼-yd. No. 977. All incorporate advanced design features, and all are available with a choice of buckets for top production on *your* job.

Your Caterpillar Dealer has the facts and figures on the new Traxcavator line. Call him today for an on-the-job demonstration—and count on him whenever you need skilled Caterpillar service and parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

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YOUR DEALER
WILL DEMONSTRATE**

usual law, although a contract existed between the lessor and lessee to the effect that the lessee must take full and exclusive control over both the truck and driver. Also, the Interstate Commerce Commission's regulation requires that a lessee of a truck assume exclusive possession, control, and use of leased equipment. In other words, although the Interstate Commerce Commission's regulation states that the lessee is the employer of a driver of a vehicle covered by the lease, yet the lessor is liable for injuries caused by the driver over whom he has or retains control as to how, when, or where the driver operates the vehicle.

For example, in *Gibson v. Moore Lines, Inc.*, 75 N. W. (2d) 213, it was shown that the owner and lessor leased its motor vehicle to an interstate motor carrier. The owner of the truck sent an employee as the operator of the vehicle.

In subsequent litigation, the higher court held that the owner of the truck was the employer of the driver and liable for compensation for his death, in view of the control retained over the driver by the owner of the vehicle. An important point of this decision is that it was so rendered notwithstanding that the provisions of the lease gave the lessee exclusive control over the driver and the vehicle, and notwithstanding the fact that the Interstate Commerce Commission regulation required a lessee of a truck to assume the exclusive possession, control, and use of the leased equipment.

Custom Is Important

Last month a higher court held that if a contract is ambiguous, the custom among other contracting parties in the same locality will be used to render the contract valid and enforceable.

For illustration, in *Morgan Company v. Pelphrey*, 230 Fed. (2d) 897, the testimony showed these facts: A general contractor and a sub-contractor signed a written contract by the terms of which the latter agreed to furnish crushed rocks to be used at an Air Force base which the general contractor was constructing in Texas. The contract between the general contractor and the owner was on a unit price basis. A schedule of designations and unit prices was annexed to and made a part of the contract. In this schedule there was included as Item No. 4, crushed stone base course of an estimated quantity of 30,500 cu. yd. at a price of $2.17 per cu. yd. Included in the specifications of the contract was the provision that the unit of measurement for base course shall be the cubic yard, measured in place and computed by the average end-area method.

However, as between the general contractor and the sub-contractor neither the letter proposal for the contract nor the letter of acceptance specifically provided that the quantity of crushed stone should be determined by measurement when in place.

When the work of the sub-contractor was completed, he billed the general contractor with mining and crushing 47,980 cu. yd. of stone at his contract price of $1.01 or $48,459.80. The army engineers estimated that there were 31,187 cu. yd. of crushed stone in the runways, taxiways, and parking aprons, and 2,415 cu. yd. of crushed stone in the perimeter road, or a total of 33,602 cu. yd. measured in place, as required by the contract between the United States and the general contractor. Hence, the general contractors, using the "in place" measurement, determined the total amount payable to the sub-contractor under the subcontract was $33,938.

The sub-contractor sued the general contractor for $14,521.80, the difference between the price of the rock when measured "in place" and when measured by loose truck measurement.

During the trial considerable evidence was introduced, including testimony that there was a custom or

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Positioning Fixture for REBUILDING and HARD-FACING TRACTOR GROUSERS

With spreads operating throughout the Western States from New Mexico to Washington, the Isbell Construction Co. with its head office in Reno has complete facilities for maintenance of heavy earth working equipment at its home base. A fixture for positioning crawler track assemblies to speed the repair of grousers is so ingenious as to have attracted wide attention.

In order to keep their tractors moving, the shop has in stock spare tracks for replacement; when grousers are worn, the track is taken off the crawler and sent to the shops, the replacement assembly is supplied and the tractor goes back to work. The old track is mounted on the fixture shown above and, as time permits, the shop weldors handle the rebuilding job. The fixture has a conventional idler and sprocket on which the track is mounted, the device being adjustable to handle a track assembly of varying length. The sprocket is power driven through a gear reducer.

The assembly is rotated so that a weldor can work on grousers at either end, welding in down hand position. The worn grouser is squared up by a cutting torch and steel bar stock, ½"x1¼", is welded on with high tensile electrodes. After the bar is welded in position a single heavy stringer bead of Stoody Self-Hardening is run across the top to give it extra wear protection.

The company has found that this fixture cuts welding time in half, simplifies handling of the track assembly and the use of hard-facing alloys stretches out service life between track overhauls.

The Stoody Guidebook—the "Bible" of heavy equipment maintenance—is yours for the asking. For your nearest Stoody dealer check the "Yellow Pages" of your phone book or write direct.

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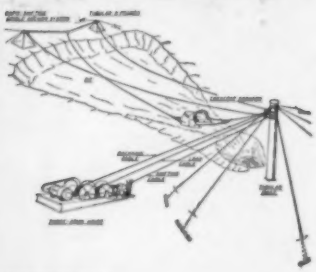
Three Sauerman Methods for Cutting Excavating and Reclamation Costs



DIGGING and CONVEYING

Rapid Shifting DragScraper—Using a rapid shifting bridle system, a 4-cu. yd. DragScraper digs 200 cu. yds. per hour from an 80-acre gravel deposit. Rapid Shifter permits selection of desired sizes from various pit locations to obtain a proper mixture.

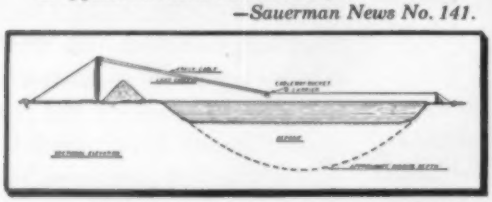
STORAGE and RECLAMATION

DragScraper—Clay reclamation from this 200-ft. storage shed is efficiently handled by a 1-cu. yd. DragScraper. From the controls of the Sauerman Hoist, the operator can reclaim to hopper from any part of the shed area. Winch at left provides power for lateral shifting of tail block and trolley on monorail.—*Sauerman News No. 140.*

UNDERWATER RECOVERY

Slackline Cableway—This cableway excavator is digging 50 ft. below water and delivering to a 60-ft. surge pile. Average haul is 600 ft. The slackline permits building a large stockpile due the height of discharge. (Drawing shows details of typical slackline installation.)

—*Sauerman News No. 141.*



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usage in Texas that crushed stone was bought and sold by loose truck measurement. The higher court therefore held that the general contractor must pay the sub-contractor on the basis of the amount of crushed stone furnished by the sub-contractor measured by the loose truck measurement. The court said:

"Neither the letter proposal nor the letter acceptance specifically provides that the quantity of crushed stone should be determined by measurement in places by the United States Engineers, as contended by the general contractors, or by loose truck measurement, as claimed by the sub-contractor. The evidence of custom and usage is admissible to supply that which the writings omit. If the language of a contract is ambiguous, uncertain, incomplete, or inconsistent, evidence of usage or custom is admissible to show the meaning intended by the parties. We cannot reach a conclusion other than that the parties intended that the sub-contractor should furnish 40,000 cu. yd. of crushed stone, measured by loose truck measurement, and as much more as might be required to provide the 30,500 cu. yd. or more, measured in place, and that payment was to be made on the truck measure basis, rather than being measured in place."

Must Prove Suicidal Attempt

A letter recently received from an official of a cement corporation situated in a relatively small city read as follows: I shall appreciate . . . discussion . . . as to why, for example, the amount of damages allowed by higher courts for injuries to employees seems to far exceed the compensation allowable under the State Workmen's Compensation Act. Also, if and when you locate a new decision involving the suicide of an employee, I should like to know how the court will consider claims for compensation by the employee's wife and other relatives."

Last month a higher court rendered an important decision on the legal question as to whether or not a deceased employee committed suicide.

For illustration, in *Graham v. Suffolk Company,* 128 N. E. (2d) 813, the issue presented the higher court was whether the deceased employee, Graham, met his death in the course of his employment by accident, or by suicide. The testimony showed these peculiar facts: Graham met his death on the company's premises, during working hours, at a place where he customarily performed the tasks incident to his regular job. A

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Your home is made with BRICK . . . *no matter what you build it of!*

Your home—from roof to cellar—and everything in it: the windows to look from . . . the lights to read by . . . the rugs to walk on . . . the chairs to sit in—even the work-saving appliances in your kitchen and the clothes in your closet. Everything that's made . . . everything that moves owes its very existence to refractories.

You see, refractory brick carries the load within industry. But, beyond industry, everyone comes in direct contact with refractories in daily living. The making of refractory products is the most basically necessary industry—with the exception of agriculture—there is.

To provide the right refractory industry needs—castables, plastics, ramming mixes, firebrick, mortars, insulating brick and insulation—General Refractories operates the world's largest refractories research laboratory . . . constantly seeking perfection . . . drawing resources from all over the globe.

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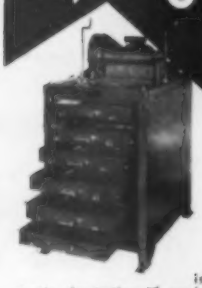
98 USERS IN 100 say GILSON IS FOR YOU!



The GILSON Screen

is designed for quick, accurate size-testing of crushed stone, gravel, slag, coal, ores, and similar materials. It handles up to one cubic foot of sample, makes seven separations simultaneously in five minutes or less.

A questionnaire to GILSON users, many of them owners of several screen units, showed that 97.5% not only approved GILSON, but recommended it to others. The remaining 2½% includes 1% who found GILSON performance satisfactory but reserved recommendation, and 1% with no comment.

GILSON users cut costs, increase profits by avoiding guesswork and error in meeting sizing specifications.

87.1% of GILSON owners reported maintenance "normal" or "light." Of these units in use at least 3 years and up to 14 years, 32.3% report no maintenance except lubrication!

Write for information and prices NOW!

A Sand Attachment for handling 8-inch sieves is optional equipment.

GILSON SCREEN CO.
MALINTA, OHIO

fellow worker testified that he saw Graham running up the ladder leading to a small service platform near the top of a superheater. This witness further testified that when he looked up again a few moments later, "the next thing I saw was his (Graham's) feet sticking out of the superheater." The charred remnants of Graham's almost completely incinerated body were later taken from the bottom of the superheater.

The Workmen's Compensation Board held that Graham's death was accidental and made award to Graham's dependents of compensation. The employer appealed and the lower court (126 N. Y. S. (2d) 666) reversed the board's decision and dismissed the claim, holding that Graham had committed suicide, under which circumstances no compensation is allowable. Graham's dependents appealed to the higher court, which decided that since the facts were only partially unwitnessed, to overcome the finding of the board, the employer had the burden of demonstrating by "substantial evidence to the contrary" that the resulting death was in fact due to suicide. To meet this burden the employer offered hearsay and opinion evidence in the form of the coroner's certificate listing suicide as the cause of death; the opinion of an officer who investigated the accident; and the expert opinion of an engineer who testified that a person of the height of the decedent, standing on the service platform located near the top of the superheater, could not fall into the stack. Also, to show motivation and suicidal tendency, proof was offered to the effect that the decedent (Graham) was having matrimonial difficulties; that his wife had obtained an interlocutory decree of divorce with provisions for alimony, and that on the morning in question he was moody and uncommunicative. Nevertheless, the higher court held that Graham's death was accidental and awarded compensation to Graham's dependents, saying:

"Despite this opinion testimony, the board was justified in concluding that the decedent's (Graham's) presence at the top of the superheater just before he disappeared into it could reasonably be accounted for as being for the purpose of realigning the clapper. While that function was not part of his assigned duty as crew foreman, it is not at all unusual for an employee to do something other and more than is required of him, to his injury. When he does so, he is not penalized, for his right to compensation is not dependent on freedom from fault."

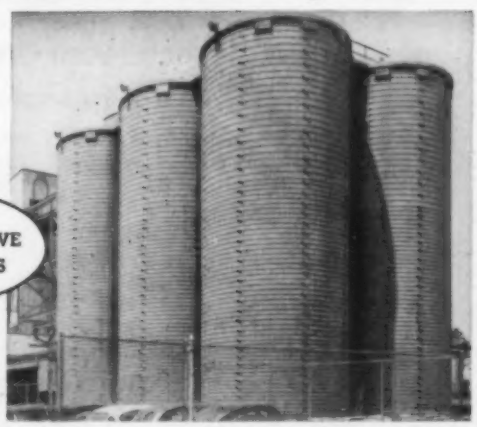
With respect to allowance of damages by juries for injuries to employees who, for some reason, are permitted to sue the employer for damages instead of accepting compensation allowable and specified by the State Workmen's Compensation Act, I shall review this late case:

Recently a higher court awarded $32,000 damages to an employee who injured his hand. See *Hudgins v. Gregory*, 219 Fed. Rep. (2d) 257. Here the testimony showed these facts: One Gregory so injured his hand that it was necessary to amputate the thumb and index finger. Due to the fact that the employer had violated certain regulations of the State Workmen's Compensation Act, Gregory brought suit against his employer to recover damages for these injuries.

The jury awarded Gregory $32,000 damages. The employer appealed to the higher court on the grounds that $32,000 damage award for the injury was excessive. The higher court approved the verdict, saying:

"There is no merit in the owner's (employer's) contention that the verdict of $32,000 is clearly excessive and without basis in fact. The rec-

There's a heavy conveying system atop these Neff and Fry Bins



SUPER-CONCRETE STAVE STORAGE BINS

A continuous reinforced concrete roof on the six 20' x 52½' bins carries a big screw conveyor with piers, chutes, etc. Observe that there are no additional supports from the ground. The bins themselves support the entire load.

This strikingly proves the load-bearing strength of Neff & Fry Bins. Of course, the bins also have the lateral strength to contain 4,000 tons of grain.

The walls of Neff & Fry Bins are constructed of Super-Concrete Staves. For a complete understanding, read our folder, "Bins With the Strength of Pillars." Ask for it now before you forget.

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Owners everywhere report:

"4-in-1 Skid-Shovel beats a fleet

of limited-duty rigs...outearns 'em all!"

"Clamshell cuts out hand labor"—Boh Brothers Construction Co., New Orleans, La. "If ever one machine could 'do it all,' our International Drott TD-9 Four-In-One Skid-Shovel is it," states Sam Venus, for Boh Brothers Construction Co., New Orleans, La. "Its clamshell action, for example, cuts out hand labor. We produce 150-175 5-yd. truck loads per 9 hrs." Watch the clam "surround" loose stuff—heap itself in one fast gulp!

"Loads 'high ones' others can't"—Mike Ferrantino, Dearborn, Mich. Mike Ferrantino, Dearborn, Mich., using his TD-9 Four-In-One, averaged loading 26 5-yd. trucks per hr., on a housing project. "I can load 'em from any angle, high tandems and all, with the high-reaching, bottom-dumping clamshell," he says. "My Four-In-One does so many jobs others can't do—even cleans itself of damp clay, dumping as a clamshell."

"Moves material where others quit"—Consolidated Construction Co., Bayside, Va. "Our International-Drott TD-9 Four-In-One will move material where other units quit," declares Consolidated Construction Co., Bayside, Va. "It's a multi-purpose rig, has high reach, and will out-load anything in its size class." Here they're getting accurate "carry-type scraper" action on a housing project, with Four-In-One in Bullclam position!

"Beats the others in job variety"—Leon Sumler, Memphis, Tenn. "With it, I can do a far wider variety of jobs than the others," reports Leon Sumler, Memphis, Tenn.—of his International-Drott TD-9 Four-In-One, shown tearing up old filling station slab and footings to load out. "The clamshell speeds the job," he adds, "and Drott bucket roll-back makes it possible to keep heaped loads. It's the one-tractor-man's ideal rig."

4 IN 1

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The Frog, Switch & Mfg. Co. CARLISLE, PA.
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ord shows that the injuries suffered by Gregory have caused a 75 percent loss of use of his left hand. His life expectancy is 37 years. In short, we think the record as a whole contains ample evidence to support a verdict of $32,000. While this amount may, at first blush, seem excessive, we cannot say it was so arbitrary as to show passion or prejudice on the part of the jury."

In this particular case the laws under the State Workmen's Compensation Act would have allowed the employe $6,500 for the same injuries. This court explained that when an injured employee relies on the State Workmen's Compensation Act to recover compensation, he must accept the award for the particular injury as provided by this law. On the other hand, if the employee sues his employer for damages, a jury will decide the amount of allowable damages. Generally speaking, the higher court will approve the jury's award.

Letters Not Received

This legal question is often asked: If a purchaser of materials denies that he received it, can he win a suit based on the contents of the letter?

The federal law states that when the writer of a letter on which the postage is prepaid properly addresses the letter and has printed on the outside of the envelope his name and address, and the letter remains uncalled for at the office to which it is addressed, the postmaster shall return the letter to the writer without additional charge for postage. If the writer has written on the envelope the date the undelivered letter shall be returned to him, the postmaster must return it to the writer according to these instructions. If the writer fails to specify when the undelivered letter shall be returned to him, then, under these circumstances, the postmaster may use his own good judgment on what date he shall return the letter to the writer. If the addressee denies that he received the letter and it was not returned to the writer, the law presumes that the addressee received it, provided that the writer proves that he properly addressed the envelope, placed the required postage on the envelope, and deposited it in a post office or government mail box. This law is applicable in all suits involving receipt of letters.

For example, in *Adams v. Plaza Inc.* 43 S. E. (2d) 47, it was shown that one Adams purchased certain real property which he leased to a tenant. The lease stated that unless written notice of an intention to terminate the lease is given by the landlord to the tenant at least 90 days before the termination of the lease, it would renew itself from year to year. The tenant held over after termination of the lease although the landlord notified him to vacate. The tenant refused to surrender possession to the owner, claiming that he never received any notice that the lease would be terminated.

The landlord filed suit to compel the tenant to vacate the premises, claiming that more than six months before the expiration of the lease he had written a letter to the tenant stating that the lease would not be renewed at its expiration. The tenant denied that this letter had ever been received by him.

The landlord testified unequivocally that he typed the letter himself and mailed it in the post office.

The jury decided that the tenant had not received the letter and therefore that the lease was automatically renewed. However, the higher court reversed the verdict, saying that the law presumes that the addressee of a properly posted and addressed letter received it.

A review of leading higher court decisions discloses peculiar laws in respect to the time of mailing. For

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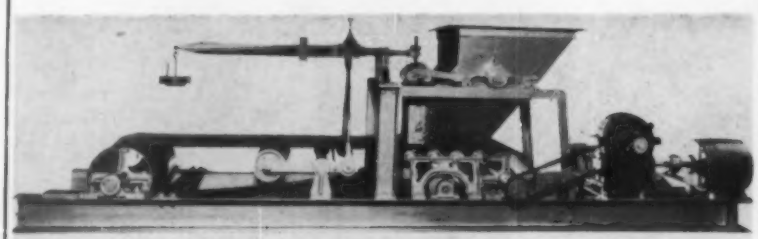
on Scaling Costs



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SCHAFFER POIDOMETER CO., 2828 Smallman Ave., Pittsburgh 22, Pa.

Illustration from Agricola's De Re Metallica (1621)

Arduous Work—Small Production

In centuries past, the production of metals could be measured by handfuls. Small wonder when comminution was done by a hammer and beneficiation was limited to hand-picking.

Fortunately, today's modern processing plants treat many tons of ore and produce many tons of metals, thus making possible our "metal age" civilization. This large production requires modern grinding methods which in turn utilize such grinding media as those produced by CF&I. The grinding balls and grinding rods produced by CF&I are *always* made from special analysis steels with the ideal balance between toughness and hardness to assure optimum grinding ability and maximum wearing ability.

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illustration, the law presumes that the addressee of a letter received it, the instant the sender deposited it in a United States post office or regulation mail box. Recently, for example, a buyer in California ordered a quantity of special quarried stone from a seller in Ohio. The seller in Ohio accepted the order by depositing a letter in a United States post office at 5 p.m. January 15, 1956. At 4:45 the same day the purchaser sent a telegram cancelling the order. Since the telegram was not delivered until after the seller deposited the accepting letter in the United States post office, the higher court held that a valid contract was completed.

Industry Personalities

The appointment of ROBERT ORNDUFF JR. to the position of traffic manager and sales executive was recently announced by the Oregon Portland Cement Co. Mr. Ornduff has a background of management of a Portland, Oreg., ready-mix concrete plant.

H. B. SMITH

HAROLD B. SMITH, who was formerly assistant manager of the Ruberoid Company, was recently promoted to the post of district manager.

Mr. Smith entered the building materials field in 1948 after nearly 20 years in the newspaper and advertising business. He served in World War II with the armed forces and later was engaged in business in Mexico City. His affiliation with Ruberoid began when that concern acquired the firm for which he was a sales representative in 1952. He had served as assistant district manager in the Kansas City area since 1951.

The appointment of T. L. LOVE SR., as assistant manager of the Calaveras Cement Company plant at San Andreas, Calif., has been announced by Grant Metzger, plant manager.

Mr. Love joined the company as chief clerk on January 1, 1934, and has been plant personnel manager since 1948. He was associated with the Pacific Gas and Electric Company, the Charles F. Ruggles Lumber Company, and the Radio Corporation of America before becoming a member of the Calaveras staff. His appointment fills a vacancy created in December, 1954, by the death of Marion S. Heard.

The Alpha Portland Cement Company, Easton, Pa., announces the appointment of H. EUGENE BROWN as southern sales manager, effective July 1, succeeding CHARLES P. POSTELLE, who retired on June 30. Mr. Postelle, formerly with the Phoenix Portland Cement Company, had ably filled this position since 1928, when Alpha purchased the Phoenix Company.

Mr. Brown joined Alpha in 1924 and held the post of sales representative and later assistant district manager in the Ohio-West Virginia-Kentucky territory prior to his recent appointment.

During a recent meeting of the board of directors of the Memphis Stone and Gravel Company, CHARLES D. SMITH II was named president of the company, succeeding Jesse S. Cooper, who was elected chairman of the board and general manager of the firm.

NOBODY . . .
BUT NOBODY
BUT . . .
SPANG
makes a completely
weldless
alloy-steel
jar
drills up to 4 times more footage-with fewer fishing jobs
For Cable Tool data and catalog see your Spang dealer or write to:
SPANG & COMPANY
DEPT. M-3 • BUTLER, PENNSYLVANIA
For over 60 years Manufacturers of Spang Weldless Jars and a Complete Line of Cable System Drilling and Fishing Tools for Oil and Gas Wells, Prospect Drilling and Shot Blast Holes.

SECO SCORES ON PERFORMANCE FOR JEFFERSON COUNTY, OREGON

Photographed on-the-job Madras, Oregon

SCREENS APPROX. 100 TPH — 3/4" ROADBED GRAVEL AT COMPACT, MODERN COUNTY OWNED MADRAS PLANT

The SECO type S vibrating screen shown directly above the bin in the above photograph is operated by the Jefferson County, Oregon Highway Department.

SECO'S time-proven, fully controlled true circular action is paying off here in a highly satisfactory way. Like all SECO'S, this one is a smooth performer. While it delivers high tonnages of accurately screened material, it does it smoothly and effortlessly without unduly shaking the supporting structure.

Whatever your own screening requirements, it will pay you in better results to turn to SECO.

SEND FOR CATALOG #204

SECO WITH ELECTRICALLY HEATED WIRE CLOTH OPENS NEW SCREENING POSSIBILITIES FOR DAMP, STICKY MATERIALS

If you have a material with high moisture content to be screened, this may be your answer. Write for complete information.

SECO

TRUE CIRCULAR ACTION

VIBRATING SCREENS

Go Modern with SECO SCREENS for Greater Profits

Seco welcomes the opportunity to help you do a better screening job. Plan now for years of more profitable screening whether it's fine aglime or coarse rip-rap.

SCREEN EQUIPMENT CO., INC.

Buffalo 25, N. Y.

Quality you can trust

Price frequently sells Wire Rope Slings . . . but quality should always be the major consideration. WIRECO "Brawny Brownie" Slings have the built-in quality to stand the gaff in tough quarry usage . . . available in 54 standard types to meet your particular needs.

SPECIFY

Brawny Brownie

WIRECO SLINGS

SEND FOR THIS SLING CATALOG

. . . it describes and illustrates 54 WIRECO SLINGS, with capacity tables on each. It will be helpful in your office. For your copy, please write:

WIRE ROPE CORP. OF AMERICA

600 N. SECOND ST. JOSEPH MISSOURI

104

Manufacturers' News

W. A. Rundquist has been elected vice-president, sales promotion, for Pioneer Engineering Works, Inc., a subsidiary of Poor & Company, Chicago, Ill. He has also been director of advertising and sales promotion activities for Pioneer since 1945.

W. A. Rundquist

A. J. Belanger

A. J. Belanger has been elected vice-president, sales, for Pioneer. He joined the engineering department in 1940, where his activities were devoted principally to the design and development of the company's continuous process bituminous plants. In 1951 he was appointed assistant sales manager and in 1953 named sales manager.

Acquisition of a new plant at Tuckahoe, New York, has been announced by Shunk Manufacturing Company, Bucyrus, Ohio, producer of blades and cutting edges for heavy-duty earthmoving and road machinery.

Like Shunk's Bucyrus, Ohio, plant, the Tuckahoe plant will be equipped with more than 3000 blade and cutting edge specifications in order to furnish these products for all types of appropriate machines.

John Graham, general manager of sales for American Steel & Wire Division, Cleveland, Ohio, retired after 45 years of service in the sales department of this Division.

Richard E. James, Jr., Birmingham, Ala., branch service engineer, has been named manager of the new Indianapolis branch to be opened this fall by Thor Power Tool Co., Aurora, Ill.

A veteran Thor sales and service engineer, he has concentrated since 1950 on industrial accounts in southern states. He has served in industrial engineering capacities with several companies, including U. S. Pipe and Foundry Co., Bessemer, Ala.

R. E. James, Jr.

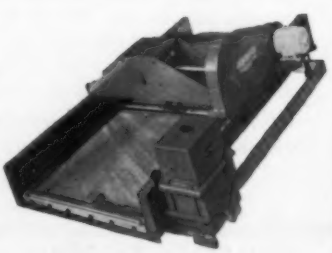
J. P. Bank

John P. Bank, a 27-year veteran of Thor Power Tool Co. and works manager of its Aurora, Ill., plant since 1948, has been appointed sales engineer.

This appointment marks an expansion of Thor's sales engineering division to provide wider field contact between the factory and Thor tool users. Mr. Bank joins G. H. DuSell, sales engineer, who has directed the division since 1941.

For Highest Efficiency on Difficult Fine Mesh Screening

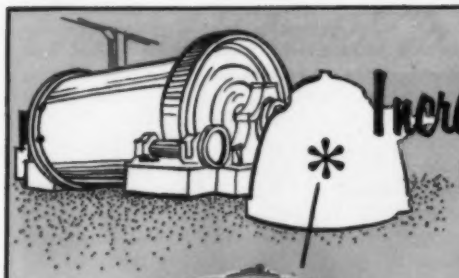
The new Model E Leahy® Heated Screen has been designed for the most efficient screening of damp fines such as lime, ag-lime or silica sand. It is a completely new integrated unit with built-in heating and differential vibration, all coordinated for low cost production on back-breaking schedules. Send for Bulletin 16-EH.



Made by the Original Deister Company Incorporated 1906

THE DEISTER CONCENTRATOR COMPANY

911 Glasgow Avenue, Fort Wayne, Indiana



Increased CEMENT PRODUCTION
BRADLEY HERCULES MILLS

* *as a preliminary pulverizer for compartment or tube mills.*

The quickest, most economical way to increase your grinding capacity

For the cement manufacturer with excess kiln capacity . . . here is the answer to INCREASED CAPACITIES at an appreciable SAVING IN HORSEPOWER. The Bradley Hercules Mill, used as a preliminary pulverizer, before compartment mills or tube mills, results in INCREASED PRODUCTION of finished material at a LOWER COST per barrel.

Rugged, dustless construction, maximum accessibility keep maintenance costs at an absolute minimum.

Automatic electrical feed control eliminates manual operation.

For complete information, write for Catalog No. 57

Bradley PULVERIZER CO.

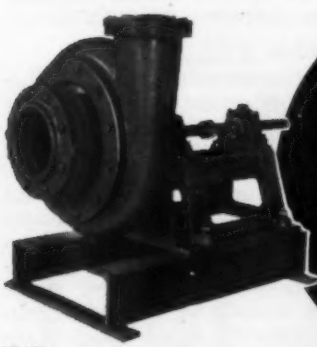
LONDON **ALLENTOWN, PENNA.** BOSTON

For Handling Abrasive, Fine Mesh Solids at Minimum Cost!

Lightning
MODEL RU
RUBBER LINED PUMPS

OUTLAST METAL LININGS 5 TO 10 TIMES!

Ideal for handling silica sand, glass sand, coal silt, remnants from classifiers or any other abrasive slurry. The simple design of the pump and its long wearing construction assure long, trouble-free service life, high operating efficiency and a minimum of care. Available in 6" x 8" and 4" x 6" sizes.



- NO PERIODIC ADJUSTMENTS
- ONLY THREE WEARING PARTS
- NON-CLOGGING IMPELLER
- STAINLESS STEEL SHAFT

AD 101

A new bulletin completely describing this pump is available . . . write

KANSAS CITY HAY PRESS CO.

Manufacturers of Heavy-Duty Lightning Sand and Gravel Pumps

801 Woodswether Road Kansas City, Missouri

AUTO VORTEX CLASSIFIERS . . .

MOST EFFICIENT BY ANY MEASURE FOR SINGLE OR MULTIPLE SPLITS!

COMPARE RESULTS . . . COMPARE COSTS . . . AGAINST ANY OTHER SAND GRADATION EQUIPMENT! AFTER SUCH COMPARISON, YOU, TOO, WILL BUY AUTO-VORTEX CLASSIFIERS . . . WHATEVER YOUR SPECIFICATIONS . . . WHATEVER YOUR PROBLEMS!

WRITE FOR OUR BULLETIN No. 81!

PATS. PEND.

CHARLES E. WOOD COMPANY

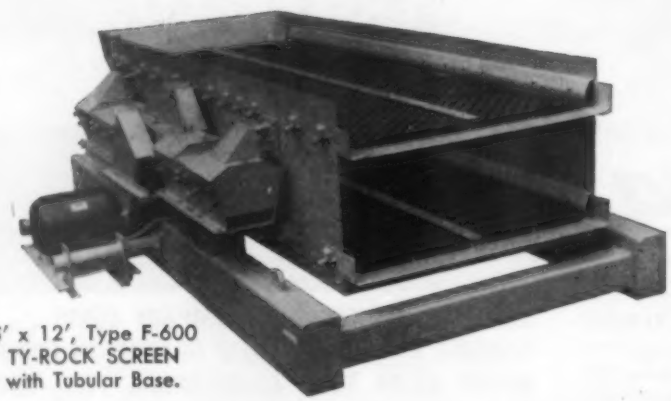
906 NORTH WATER ST. • MILWAUKEE 2, WISCONSIN

A $9,000,000 building and tooling program for LeTourneau-Westinghouse Company, earthmoving and material handling equipment manufacturer with headquarters at Peoria, Ill., has been announced by Merle R. Yontz, company president.

Mr. Yontz, in announcing the huge expansion program, stated that the additional building space and machine tools will provide more than double the productive capacity of LeTourneau-Westinghouse Company since its organization in 1933. At Peoria alone, the productive capacity will be increased to more than 150 percent of the capacity available at the time the company was formed.

The Admiral Alloy Steel Corp., Cleveland, Ohio, has opened a new warehouse in Texas which will serve the southwest portion of the country, according to George Layton, president. The Texas warehouse will operate as a separate corporation known as the Admiral Alloy Steel Corporation of Texas. Mr. Layton will serve as president of the new corporation. J. H. Stecker will serve as vice-president and general manager. Mr. Stecker's office will be at 2802 Rector Street, Dallas, Texas, also the address of the corporation. Like the parent company, the Dallas warehouse will offer a complete line of plates and bars.

FOR PROFITABLE SCREENING USE



5′ x 12′, Type F-600 TY-ROCK SCREEN with Tubular Base.

TYLER VIBRATING SCREENS AND TYLER WOVEN WIRE SCREENS

There is a Tyler Vibrating Screen for every sizing and dewatering job. Tyler Screens are noted for the huge tonnages handled with top efficiency and low cost per ton.

Tyler Woven Wire Screens are made in all meshes and metals in over 10,000 different specifications. Ton-Cap and Ty-Rod Screens with the long-slot openings provide the greatest capacity for a given discharge area.

THE W. S. TYLER COMPANY
CLEVELAND 14, OHIO
Manufacturers of Woven Wire Screens and Screening Machinery

Clyde W. Truxell, former works manager of the Detroit Diesel Engine Division of General Motors Corporation, Detroit, Mich., has been appointed general manager of the division. He succeeds Semon E. Knudsen, who is now general manager of GM's Pontiac Motor Division.

Mr. Truxell's first association with the GM Diesel engine was in 1932. At that time he was appointed a member of General Motors research staff and had much to do with the development of the GM two-cycle Diesel first exhibited at the Chicago World's Fair in 1933. His efforts were later directed to the development of the more compact, Diesel power package which today is used in many applications in the industrial, construction and marine fields.

C. W. Truxell

R. O'Connell

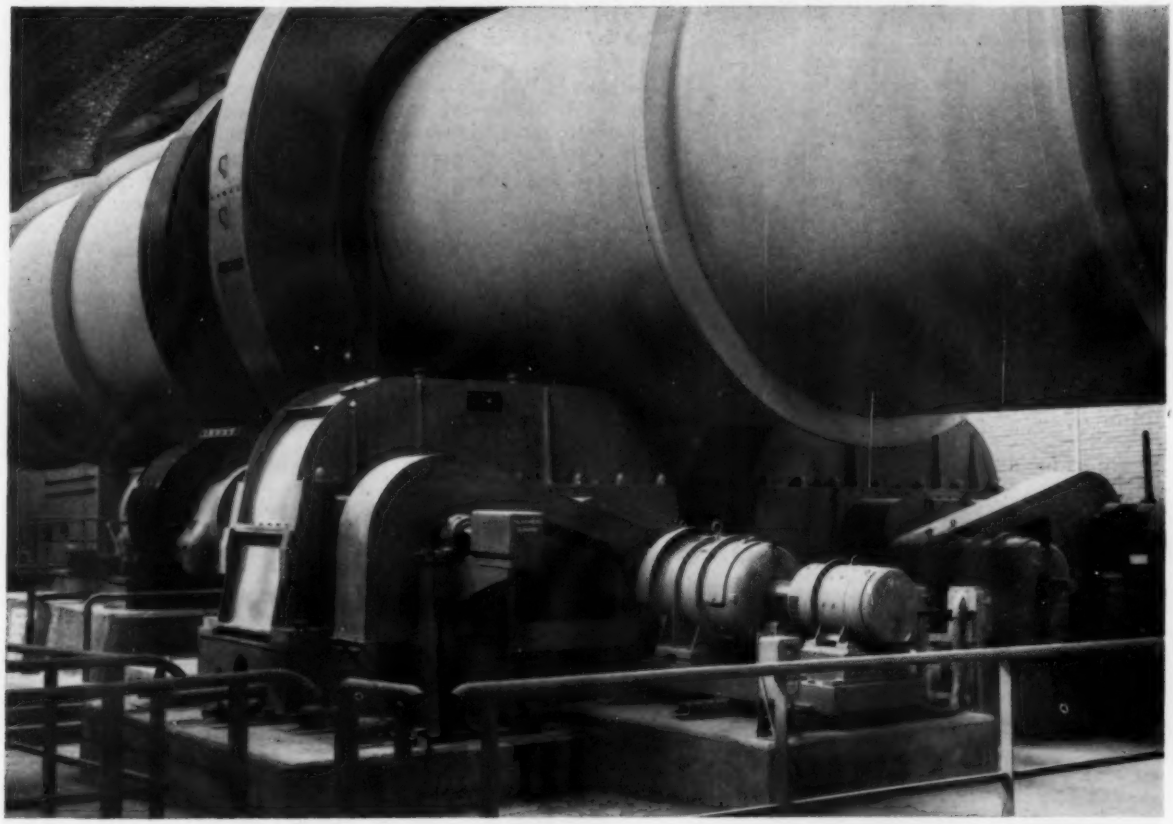
Robert O'Connell has been named service manager of Gar Wood Industries' Findlay Division in Findlay, Ohio. He was formerly associated with Clark Equipment Co. as assistant service manager of their Industrial Truck Division at Battle Creek, Mich.

In his new capacity, Mr. O'Connell will direct service activities for the full line of Gar Wood and Gar Wood-Buckeye construction equipment, including Gar Wood-Buckeye ditchers, finegraders, highway wideners, Gar Wood power shovels, truck cranes and highway material spreaders.

The appointment of Carlton Shamo as supervisor of publicity for Dodge Manufacturing Corporation, Mishawaka, Ind., has been announced.

Mr. Shamo was editor of the Studebaker Spotlight, monthly magazine for employees, and handled various publicity and employee relations projects as a member of the public relations and industrial relations staffs. He will develop and coordinate product publicity for various business and trade publications for the Mishawaka concern, manufacturers of power transmission equipment.

Profitable trends in the use of refractories



For peak production switch to Laclede high alumina kiln liners

When your kilns operate day and night, long refractory service and little maintenance become critically important. Then the use of Laclede high alumina kiln liners gives you the satisfaction and dependability you need. They offer advantages of unusually low porosity, high strength, high density, high resistance to fluxing action of clinkers and possess high refractory values.

Laclede 70 (70% alumina) liners are made of high grade, selected Missouri diaspore, expertly blended with bauxite and bond clays. They contain materials and blending skill, plus quality control that produces only "quality-first" refractories. Laclede Peerlac (60% alumina) meets the same type of standards.

Prompt service is also a Laclede specialty. Call on your nearby Laclede representative soon.

Uses of LACLEDE High Alumina Kiln Liners

LACLEDE 70
(70% Alumina) — particularly suited for hot zone liners in cement, lime, dolomite and magnesite kilns.

LACLEDE PEERLAC
(60% Alumina) — for kiln areas requiring lining material of higher refractory value than high duty and super duty fire clay brick.

HKP — LACLEDE-CHRISTY COMPANY — FOUNDED 1844

LACLEDE-CHRISTY COMPANY

DIVISION OF H. K. PORTER COMPANY, INC.

2000 Hampton Avenue · St. Louis 10, Missouri

Wilson H. Madden has joined the Thew Shovel Company, Lorain, Ohio, as merchandising methods manager. He joins Thew with an extensive background in sales engineering, sales and market research, and sales management. For the past two years he was vice-president of the Quick-Way Shovel Company in Denver, Colo. Prior to that he had been associated with the Gardner Board & Carton Company, the National Folding Box Company, and the Pomona Pumo Company in sales engineering and management capacities.

Warren R. Snider, who has been a member of the FWD service and sales staffs since 1943, has been appointed manager of ready-mix and logging markets for Four Wheel Drive Auto Company, Clintonville, Wis. He joined the FWD organization 13 years ago in the service repair department. He moved into the service office in 1944, becoming service office manager and then field service manager for eastern states before being named sales manager of the FWD allied products division in 1954.

Establishing Rochester as headquarters for central western New York district sales and service and opening three additional sales offices of the Reliance Electric and Engineering Company, Cleveland, Ohio, manufacturer of electric motors and variable-speed drives, has been announced. The Southwestern District, with headquarters in Houston, Tex., has been divided into a Gulf Coast District, directed from the same office, and a new Dallas District, with an office in that city. The other two new offices are the Mahoning Valley Office, the Warren-Youngstown area and a sales office in Washington, D. C.

William K. Schlotterbeck moves from district manager in Buffalo to head up the new Dallas office, and Walter L. Brehmer, who has been in charge of the sales office in Syracuse, is appointed district manager of the newly created Central Western New York District. Frank A. Denison, district manager in Houston, heads up the Gulf Coast District. Frank E. Davis will manage the new Mahoning Valley Office, reporting to W. W. Spanagel, Cleveland district manager, and Henry A. Cirbee goes to Washington to operate the new office there, reporting to K. S. Lord, the Philadelphia district manager.

A change in Chicago distributors has been announced by Stoody Company, manufacturers of hardfacing alloys, Whittier, Calif.

Hardfacing Sales & Engineering Co. has been appointed exclusive distributor for the territory which includes roughly the northern third of Illinois, the southeastern section of Wisconsin and the northwestern portion of Indiana.

Hardfacing Sales & Engineering Co. is a new organization headed by Jim Kirk, well known in the welding supply field as a partner in Kirk-Wiklund & Co., also a Stoody distributor in Kansas City. A complete staff of welding specialists has been brought together to serve the territory; Ted Wiklund is a partner and other members of the staff include Frank J. Abromitis, W. N. Abbott and Victor E. Stucky.

Syntron Company, Homer City, Pa., manufacturers of industrial vibratory handling equipment, have announced the organization of a new West Virginia Sales Company, to be located in South Charleston, W. Va. Wallace P. Smith will assume the responsibility of vice-president of the newly formed company.

When Abrasoweld and Faceweld . . .

Handle 9 out of 10 hard-surfacing jobs . . .

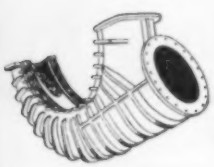
Yet cost less to buy . . .

WHY use anything else for hardsurfacing

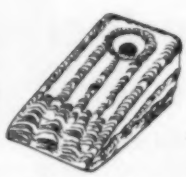
Got hardsurfacing jobs like these?

Sprocket

Crow foot



Pump Casing



Dipper Tooth

Speed 'em up with Lincoln rods... and cut your costs, too

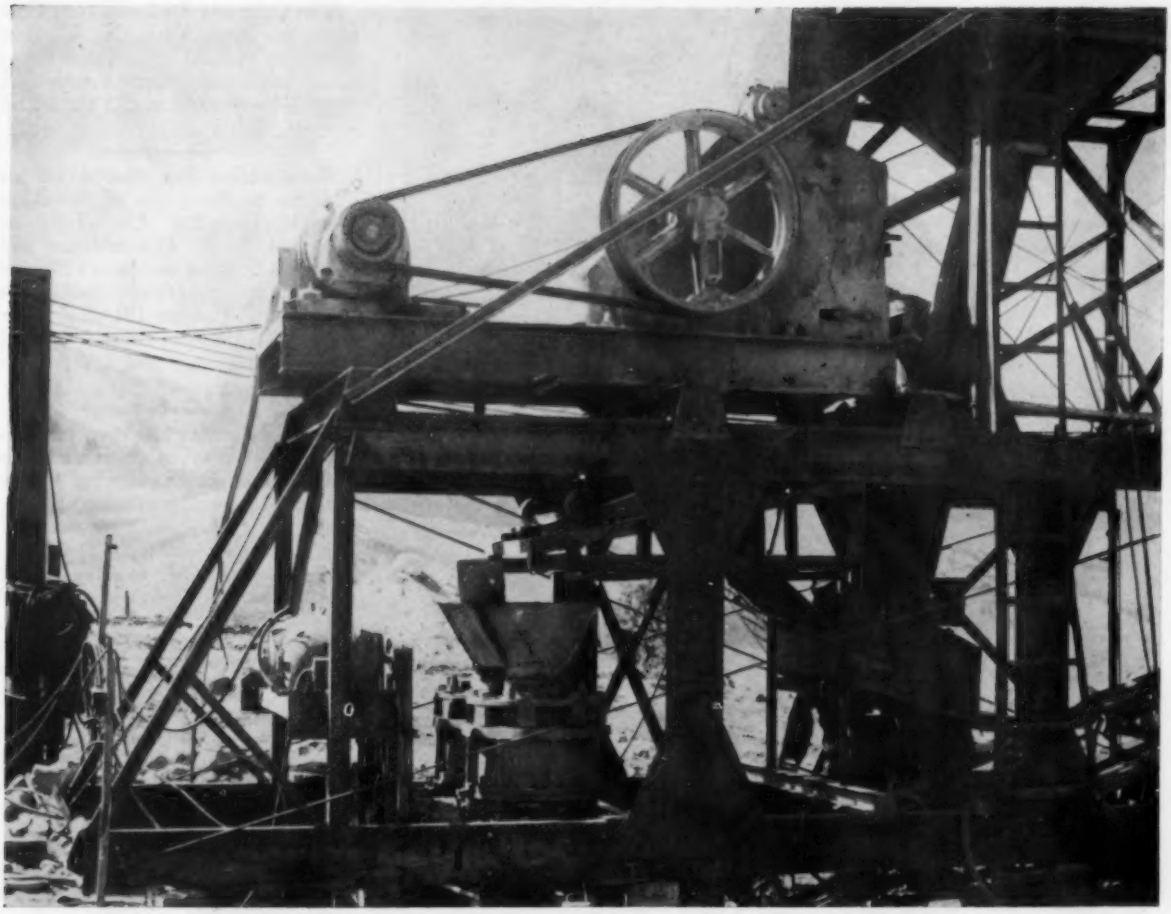
Here's how:

For severe impact and moderate abrasion use Abrasoweld, a high alloy carbon chromium rod.

For severe abrasion and moderate impact use Faceweld, a high alloy chromium carbide rod.

WELDIRECTORY SB-1352 *has the facts. SEND FOR IT. Write Dept. 5211.*

THE LINCOLN ELECTRIC COMPANY
Cleveland 17, Ohio
The World's Largest Manufacturer of Arc Welding Equipment



KUE-KEN® JAW AND GYRATORY CRUSHERS IN KNOCK-DOWN PLANT GIVE LOWEST COST CRUSHING

Speeding up moves to make short jobs profitable is no problem to this operator. Kue-Ken 36″ x 10″ jaw crusher, two 18″ Kue-Ken gyratory crushers, conveyors and vibrating screen are rapidly assembled on steel frames and bolted together. Plant capacity is about 100 tons per hour minus ⅝″. Rig is quickly dismantled and moved to next job. Kue-Ken operates inexpensively. Jaw plates outlast those of other crushers 5 to 10 times, power consumption is far less, breakage from overload is eliminated by automatic flywheel release that is quickly reset. Filtered oil lubricates the mechanism in a sealed, dust-free crankcase to prevent wear.

WRITE FOR CATALOG

STRAUB MFG. CO., INC. • 8385 Baldwin St. • Oakland, Calif.

DEALERS:

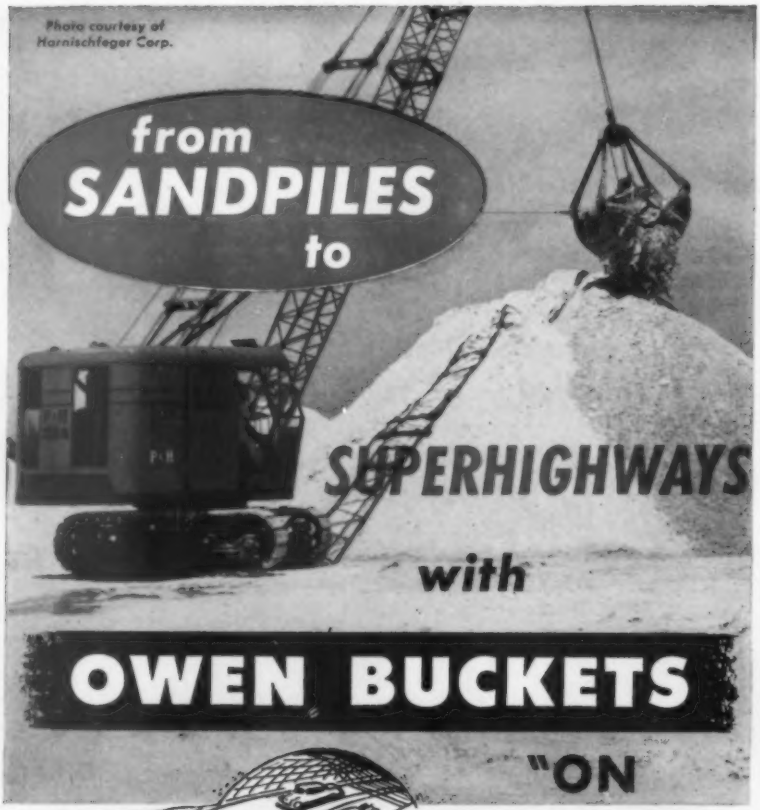
SEATTLE, WASH. .....Washington Machinery Co.
SALT LAKE CITY, UTAH .....Lund Machinery Co.
SAN ANTONIO, TEX. .....Closner Equipment Co.
PORTLAND, ORE. .....Contractors Equipment Co.
LOS ANGELES, CALIF. .....Garlinghouse, Fremon Co.
PHOENIX, ARIZ. .....Stapley's
DENVER, COLO. .....Union Supply Co.
CASPER, WYOMING .....Moss Equipment & Supply Co.
VANCOUVER, B. C. .....Universal Equipment Co.

KUE-KEN® CRUSHERS

"CRUSHING WITHOUT RUBBING"

Jaw Crushers · Gyratory Crushers · Overhead Eccentric Crushers · Revolving Screens
Classifiers · Feeders · Rib Cone Ball Mills · Concentrating Tables · Vibrating Screens

Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor. Close Works, Gateshead-upon-Tyne 8, England



It will take a "heap" of sand and gravel to make the concrete necessary for the tremendous road building programs forthcoming and presently under way.

From past experience, batch plants and construction jobs everywhere know they can rely on their OWEN BUCKETS to handle the loads from cars to pile and from piles to hoppers.

Owen material handling buckets are available in a wide range of types and sizes to best suit your particular needs.

Write for the general purpose and material handling OWEN BUCKET Catalog and get all the enlightening facts.

Manufacturers of the independent line action grapples for handling rock, scrap and pulpwood.

THE OWEN BUCKET CO.

6050 Breakwater Avenue • Cleveland, Ohio

Branches: New York, Philadelphia, Chicago, Berkeley, Calif., Fort Lauderdale, Fla.

The Colorado Fuel and Iron Corporation, New York, N. Y., has moved its Philadelphia district warehouse and sales office to new and larger headquarters at 225 West Erie Avenue.

Construction has started on an addition to the plant of the Ajax Flexible Coupling Co., Inc., at Westfield, N. Y. This addition will be located on the company's 22-acre site and will practically double the production of Ajax Dihedral Gear Type and Rubber-Bronze Bushed Flexible Couplings and other products.

Donald Saunter has been promoted to the position of director of production and purchasing for Dodge Manufacturing Corporation, Mishawaka, Ind.

Mr. Saunter joined the Dodge organization in 1937, working in the machine shop. He was in charge of night shift operations in the bearing assembly department throughout World War II, and in 1946 was made foreman of the new light duty bearing department. In March, 1951, he was named to handle special assignments for Mr. Wedlake, who was then production manager for this manufacturer of power transmission machinery.

D. Saunter

Judge Covelli

Philo Orton, Sr., has announced that the board of directors of the Orton Crane and Shovel Company, Chicago, Ill., has elected Judge Daniel A. Covelli of the Superior Court of Cook County to the positions of executive vice-president and treasurer.

Judge Covelli was admitted to the Illinois Bar in 1926, served as assistant States Attorney from 1928 to 1933, as Master in Chancery in the Circuit Court of Cook County from 1928 to 1949, Master in Chancery in the United States Court of Appeals from 1949 to 1951, when he was elected to the Superior Court. He will continue to serve on the Superior Court bench. His duties at Orton Crane and Shovel Company will be administrative.

STOP VARNISH!

Refill now with Sinclair SUPER TENOL® Motor Oil for top protection against harmful varnish in your Diesel engines.

No matter how rushed the job, SUPER TENOL protects your engine against the effects of high temperature, over-loading and *continuous stop-and-go*. Your Diesel stays on-the-job longer, with less wear . . . fewer repairs.

You get these benefits from Sinclair SUPER TENOL because it's specially made for *severe duty*. High viscosity index base oils, plus a heavy concentration of selected additives, have been combined to give you maximum protection against varnish, sludge, rust, and acid corrosion.

Refill now with Sinclair SUPER TENOL. Contact your local Sinclair Representative for further information or write Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. *There's no obligation*

SINCLAIR SUPER TENOL

Al J. Goodman, founder of the Al J. Goodman & Sons Co., Asheville, N. C., died recently.

Over a period of the last 30 years, he was active in all phases of construction equipment and was well known throughout the United States and several other countries in which he did business.

The Al J. Goodman & Sons Company will be continued by his three sons, B. Paul, Arnold S. and Al J. Goodman, Jr.

William C. Faust has been appointed manager of public relations for The Electric Storage Battery Company, Philadelphia, Pa. He formerly was public relations director for Geare-Marston, Inc., Philadelphia and New York advertising and public relations agency.

In his new post Mr. Faust will handle employee publications as well as institutional and financial public relations for the manufacturer of Exide, Willard and Grant storage batteries.

Frank W. Roman, district manager for Hercules Powder Company, Explosives Department, in Chicago, Ill., has retired upon completion of 33 years with the company. He will be succeeded as manager of the Chicago district by Robert R. Clayton, assistant district manager since 1955.

Mr. Roman has been district manager since 1942. He was named assistant district manager in 1938. He joined Hercules in 1923 as a technical sales representative in the Chicago district.

Mr. Clayton, born and educated in Denton, Ill., was chief clerk for the Cosgrove Coal Company from 1932 to 1936. He joined Hercules in 1936 as a salesman in the Chicago district. Mr. Clayton was named special representative for the Explosizes Department at Chicago in 1947 and eight years later, assistant district manager.

Robert H. Morse, Jr., president of Fairbanks, Morse & Co., Chicago manufacturers, announced recently the following changes in executive duties of the company.

V. H. Peterson, formerly vice-president in charge of railroad sales, has been transferred to the position of vice-president in charge of engineering. He replaces J. F. Weiffenbach, who recently resigned.

James G. Graham, formerly eastern regional manager of railroad sales, has been transferred to Chicago to become general manager of railroad sales.

Gordon Anderson, Jr., who was formerly assistant to the coordinator of government business, has been transferred to the office of the vice-president in charge of engineering as assistant chief engineer.

William B. Morse, who was assistant to the chief engineer, Mr. Weiffenbach, has been transferred to the coordinator of government business office as assistant to the coordinator.

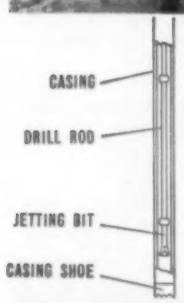
Herbert T. Cobey, vice-president of the Perfection Steel Body Company of Galion, Ohio, manufacturers of dump bodies, hoists and hydraulic lift gates, announces the appointment of R. N. Rick as advertising and sales promotion manager. He joined the company and its affiliate, the Cobey Corporation, in 1947.

Starting in the service department, Mr. Rick was shortly transferred to the sales department. In 1953 he was promoted to assistant general sales manager of the Cobey Corporation with offices in Galion, Ohio. While assuming the duties of advertising and sales promotion manager of the Perfection Steel Body Company, he will also serve the Cobey Corporation in his present capacity.

What's down there?

Empire
TEST DRILLS
come up with the
RIGHT ANSWERS

EMPIRE
Hydraulic
Testing
Drill



This test-drilling equipment is a "must" for pit and quarry operators and general contractors.
The EMPIRE Junior Drill used manually with solid rods or the EMPIRE Hydraulic Jetting Drill, using hollow rods, is the standard method of exploring sand and gravel deposits for composition and presence of clay, and accurately determines overburden depth and formation.
Easily transported in any kind of terrain. Assembled and ready for work in minimum time with ordinary labor.

Write TODAY for complete details

NEW YORK ENGINEERING CO. 75 WEST STREET NEW YORK 6, N. Y.

PLANNING FOR TODAY...
and tomorrow

The PEERLESS Cement Corporation has for years consistently followed a program of carefully studied plant modernization and new construction. With producing units strategically located to supply their markets, their goals have been: Higher ratio of output to dollars invested . . . lower unit costs . . . constant product improvement.

Throughout this period of growth, the Peerless organization has repeatedly called upon Giffels & Vallet, Inc. to furnish essential planning and engineering services. G & V's extensive experience in the cement and rock products field has also proved an important factor in helping other leading producers in the industry scale down costs and increase output.

A special Planning Brochure has been prepared by Giffels & Vallet, Inc. outlining the comprehensive planning and engineering services available. A copy will be mailed on request.

INDUSTRIAL ENGINEERING DIVISION

Giffels & Vallet inc.
DETROIT, MICHIGAN

NEW YORK
CHICAGO
HOUSTON
WINDSOR, ONT.

Engineers Serving Industry for Over Thirty Years

Appointment of several new distributors has been announced by General Road Machines, Inc., Niles, Ohio.

Herman M. Brown Company of Des Moines will serve Iowa. Selling General Road Machines equipment in Minnesota and North Dakota will be W. H. Ziegler Co. of Minneapolis. Central Indiana has been assigned to Flesch-Miller Tractor Co. of Indianapolis.

The Paving Supply & Equipment Co. of Washington, D. C., will act as general distributor in Maryland, northeastern Virginia and the District of Columbia. General Road Machines products will be sold in Delaware, New Jersey and Pennsylvania by Furnival Machinery Co. of Philadelphia. This distributor also maintains branches in Harrisburg and Pottsville, Pennsylvania. George P. Williams Co., of Cleveland, will handle general sales in northeastern Ohio.

Walter M. Young has been named director of sales at Richardson Scale Co., Clifton, N. J. At the same time John Aquadro was named head of the electrical engineering dept., replacing Mr. Young.

Mr. Young has been with Richardson since 1948, when he joined the firm's sales department. Since then he has worked in the process control department, mechanical development section, service department and electrical development department. In 1953 he was named chief electrical engineer, and has held that position until his present appointment.

Mr. Aquadro joined Richardson in 1949 as a project engineer in the electrical engineering department, holding this position until his recent appointment.

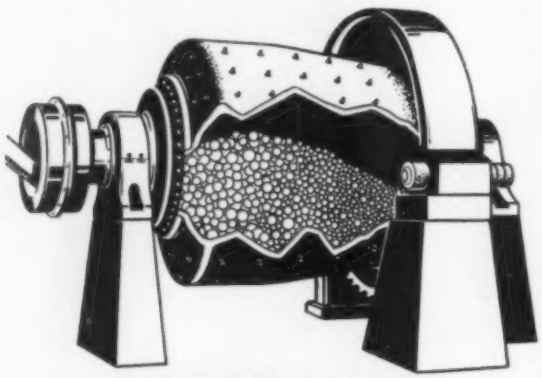
St. Regis Paper Company has moved to new headquarters in the new Socony-Mobil building located at 150 East 42nd Street, New York City. The firm will occupy the entire 39th, 40th and 41st floors. The new telephone number will be OXford 7-4400.

Personnel changes announced by the Jeffrey Manufacturing Company, Columbus, Ohio, include: William K. Myers replaces R. W. Sweitzer as district manager of the New York office. Tom Fear, Jr., replaces Harley Lee as district manager of the St. Louis office. Mr. Lee will continue in an advisory capacity. William T. Davis, formerly of the Houston District Office, goes to Western Territory Sales Office in San Francisco as application engineer. William A. Lewis was appointed sales engineer for the Houston District Office. James A. Frazier was assigned to the Industrial Sales Division at the Beckley, West Virginia, District Office.

John Chrystal, manager of original equipment sales in the Home Office, replaces C. O. McFadden as manager of the Columbus District Office. Mr. McFadden will continue in an advisory capacity. A. T. Loew succeeds Mr. Chrystal as manager of original equipment sales. Succeeding Mr. Loew is Dick Ross, who will be office manager of the Merchandise Sales Division.

Karl F. Ewerhardt has been appointed to the newly-created position of assistant general sales manager of Leschen Wire Rope Division, H. K. Porter Company, Inc., St. Louis, Mo.

Mr. Ewerhardt, previously advertising manager of the division, will expand his activities from advertising and sales promotion to the broader activities of the general sales office.



TRICONE MILLS

Highest grinding efficiency and *lowest* ball and lining wear are common to mills with a correctly segregated ball charge.

The *Hardinge Tricone Mill* is the only mill providing these essentials to low cost operation *without* the use of special linings or internal devices, which are subject to wear and are effective through only a part of their wearing life.

Complete specifications upon request. Bulletin AH–414–8 Built in Canada.

Four 11′ diameter Hardinge Tricone Mills at a Canadian Concentrating Plant.

HARDINGE
COMPANY, INCORPORATED

YORK, PENNSYLVANIA • 240 Arch St. • Main Office and Works

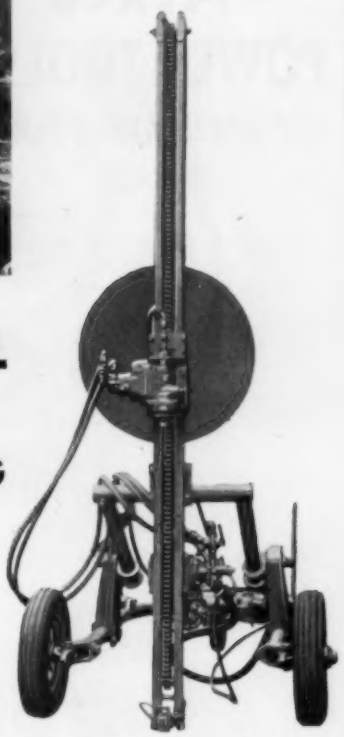
New York • Toronto • Chicago • Hibbing • Houston • Salt Lake City • San Francisco

The new FM-4 is even more rugged and versatile than its famous predecessor, the FM-3, shown here at work on the Connecticut Thruway.

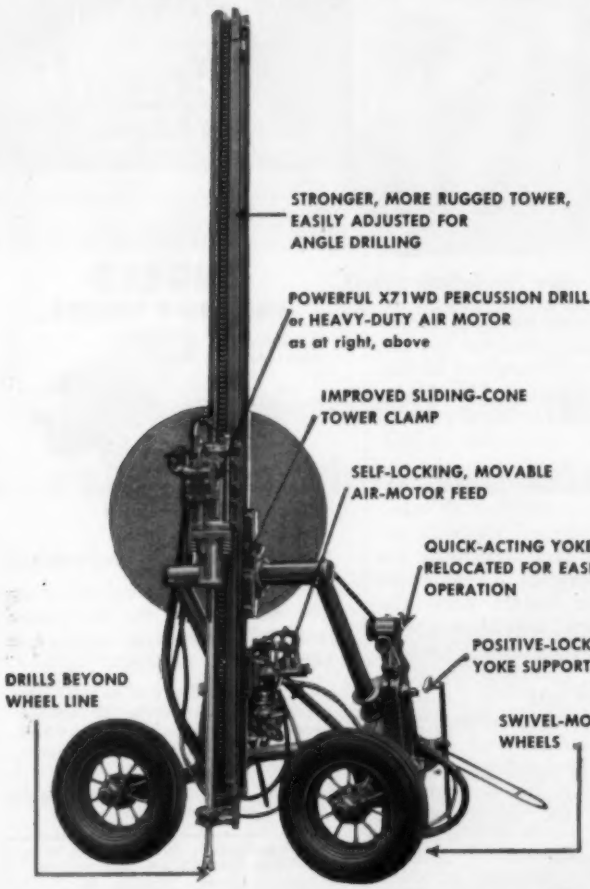
NEW FM-4 WAGON DRILL

now available for

PERCUSSION or ROTARY DRILLING



FM-4 Wagon Drill with air motor for rotary drilling.


STRONGER, MORE RUGGED TOWER, EASILY ADJUSTED FOR ANGLE DRILLING
POWERFUL X71WD PERCUSSION DRILL or HEAVY-DUTY AIR MOTOR as at right, above
IMPROVED SLIDING-CONE TOWER CLAMP
SELF-LOCKING, MOVABLE AIR-MOTOR FEED
QUICK-ACTING YOKE HOIST, RELOCATED FOR EASIER OPERATION
POSITIVE-LOCKING YOKE SUPPORTS
DRILLS BEYOND WHEEL LINE
SWIVEL-MOUNTED WHEELS

Now, whether you're drilling hard rock or soft shales and gypsum, you can take full advantage of the dependability, versatility and easy maneuverability of the Ingersoll-Rand FM-4 Wagon Drill.

Redesigned for even greater strength and ease of operation, the new FM-4 is available with the famous, hard-slugging Ingersoll-Rand X71WD percussion drill, or with an I-R heavy-duty air motor for rotary drilling with fishtail bits. This rotary unit has proved so successful for soft-ground Wagon Drill work that package "conversion units" are also being offered for use with the previous Model FM-3 as well as the new FM-4 mounting.

Whether used for percussion or rotary drilling, the new FM-4 offers the last word in rugged dependability and flexibility for fast, easy drilling at any angle. Ask your I-R representative for complete information.

Ingersoll-Rand

5-433

11 Broadway, New York 4, New York

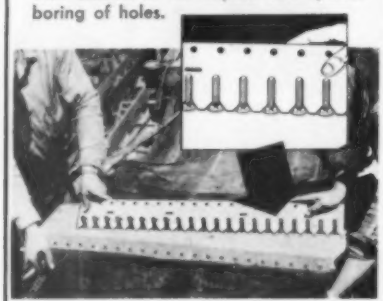
CONTRACTORS' COMBINATION

DRIFTERS • JACKDRILLS • JACKHAMMERS • WAGON DRILLS • CARSET BITS • AIR TOOLS • COMPRESSORS

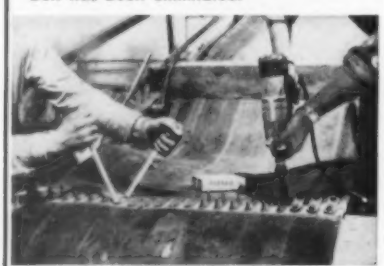
NEW
FLEXCO
POWER TOOLS
CUT APPLICATION TIME IN HALF

Your two man belt team can now join a belt 30" wide in 15 to 20 minutes . . . using the new FLEXCO Power Tools.

The FLEXCO Power Tool Boring Bit used with electric or air impact tool speeds boring of holes.



New FLEXCO Templet positions bolts for quick joining of belts. Reaching under belt has been eliminated.



Running down nuts is fast with the new FLEXCO Power Wrench used with electric or air impact tool. Two Bolt Breakers are used together to complete the joint.

If you are interested in speeding up fastener application, order the new Power Tools from your local FLEXCO Distributor. Write for Bulletin F-112-A.

FLEXIBLE STEEL LACING CO.
4623 Lexington Street • Chicago 44, Illinois

Since 1949 the thinking of the manufacturers of construction equipment has been influenced by the quiet and effective counsel of Harold F. Hess. Mr. Hess passed away at his home in Evanston, Ill., on Friday, August 3. As executive vice-president of the Construction Industry Manufacturers Association he worked long and hard for the betterment of the industry.

Mr. Hess was born in Chicago March 19, 1899. He served in the American Red Cross, overseas, during World War I. He returned to the Chicago Association of Commerce after the war and was there until 1921. At this time he became secretary-treasurer of the Interstate Merchants Council. In 1941 he went to the Chicago Association of Credit Men as director of public relations and manager of sales and advertising. He was with this organization until 1949, when he became the first executive vice-president of the newly organized C.I.M.A.

H. F. Hess

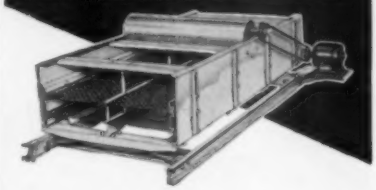
G. D. Becker

George D. Becker has been named as special design consultant for the Crusher Division of Nordberg Manufacturing Company, Milwaukee, Wis. He will make his headquarters at the company's main office in Milwaukee.

Mr. Becker has been in design engineering work for the past 35 years. A native of Cincinnati, Ohio, he began his career as a draftsman for Stedman's Foundry & Machine Works in Aurora, Ind. He joined the Crushing, Cement and Mining Machinery Division of Allis-Chalmers Manufacturing Company in 1922. During 33 years with this company, he did drafting, field service, sales contact and design work on ore crushers and allied equipment. For the past 20 years he has concentrated his efforts on the design of ore crushers.

Don E. Fricker, formerly advertising manager of The Heil Co., Milwaukee, Wis., has joined Western Advertising Agency, of Racine and Chicago, as an account executive. He will be primarily associated with industrial accounts of the agency.

UNIVERSAL
OFFERS THE BEST IN VIBRATING SCREENS AT THE LOWEST PRICE



Before you buy, be sure to get a copy of the new UNIVERSAL Catalog #1501

There's a model to fit your particular requirement, priced within the smallest budget.

Write today for free catalog #1501

UNIVERSAL VIBRATING SCREEN CO.
Racine, Wisconsin
Quality Screens Since 1919

SAVE MONEY!
UNUSED
6X6 ARMY TRUCKS

2½-ton GMC & International

- From Government Storage!
- Unused and Guaranteed!
- Factory New Condition!
- Reconditioned Trucks also Available!

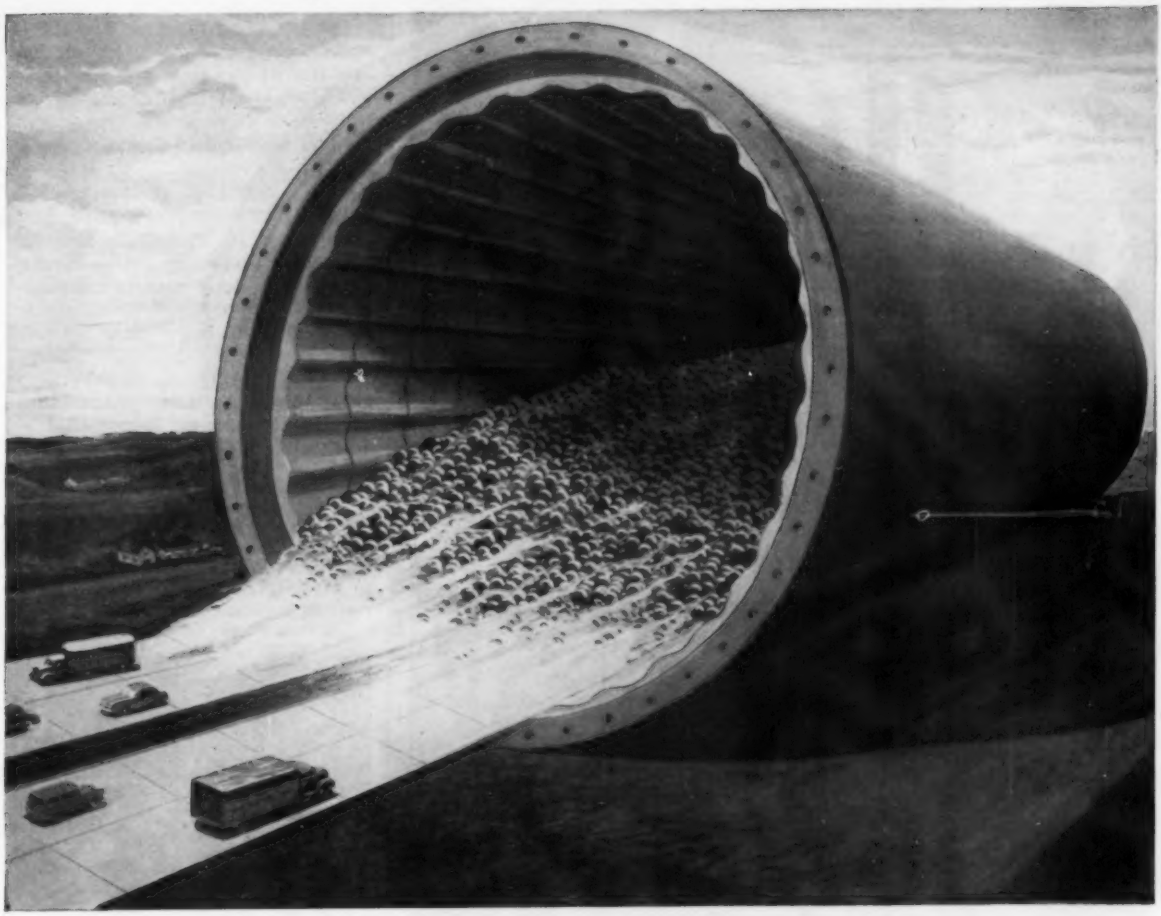
Save up to $3,000 on one of our unused Army trucks. See for yourself how TWO of our trucks cost you even LESS than *one* new truck.

Compare our Tandem Axle Trucks with front wheel drive, 10 forward speeds, overdrive and new mud and snow tires with similar equipment elsewhere.

Investigate now! . . . There's no obligation . . . and we deliver on approval!

For Specifications, Prices, Delivery Write, Wire or Phone Collect—JAckson 5-7841
MILTON Y. TOOMBS, JR.
Sales Manager

MEMPHIS EQUIPMENT CO.
766 S. THIRD ST. MEMPHIS, TENN.
CONSTRUCTION AND AUTOMOTIVE EQUIPMENT AND PARTS.



11,000 barrels of cement are necessary to construct a single mile of four-lane highway, reports Portland Cement Association.

Cement for new highways ...costs less when you use Ni-Hard Grinding Balls

Ni-Hard* grinding balls save money!

Records show that the majority of the nation's cement plants now grind clinker with these abrasion-resisting nickel-chromium white cast iron balls.

Long life cuts production costs

Users find that Ni-Hard balls give 3 to 5 times the life of other types in clinker mills. Naturally, this longer grinding life reduces "make-up requirements" as well as re-charging time and labor.

Try Ni-Hard balls in your own plant . . . see first-hand how they'll slash the cost of every barrel of cement you grind.

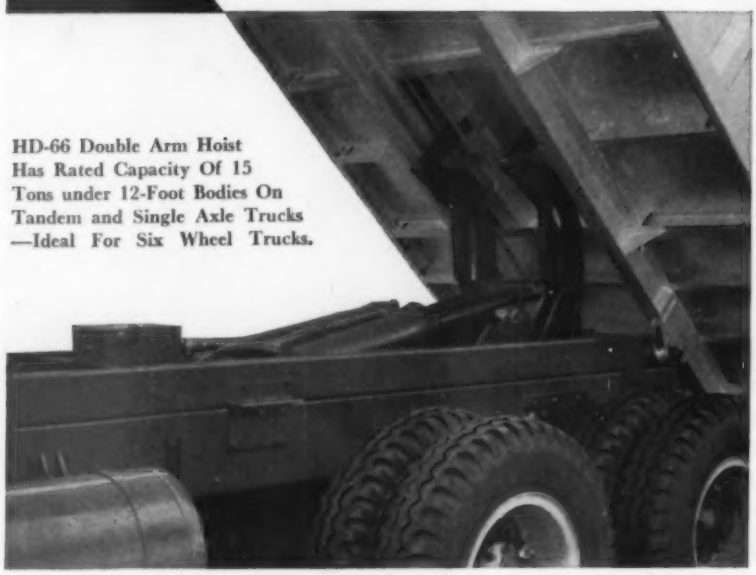
Get all the facts. Send for the 58-page booklet, *"Engineering Properties and Applications of Ni-Hard"*. Full of illustrations and service data, it's yours for the asking. With it, we'll send you a list of authorized producers of Ni-Hard castings. Write us now.

*Registered Trademark

INCO TRADE MARK **THE INTERNATIONAL NICKEL COMPANY, INC.** 67 Wall Street New York 5, N.Y.

Now!

Handle Extra Heavy Payloads with the MARION TWIN 66 HOIST



HD-66 Double Arm Hoist
Has Rated Capacity Of 15
Tons under 12-Foot Bodies On
Tandem and Single Axle Trucks
—Ideal For Six Wheel Trucks.

Extra Profit Features *that Count*

- Low oil pressure operation for smooth lifts without pressure surges.
- Exclusive equalizing double-arm lift hoist provides outstanding performance.
- Rugged, heavy duty pump provides faster dumping cycle.
- Class 12 HABMA rating.
- Economical to operate . . . compact . . . dependable for long life operation.

"Designed in the Pit"

MARION BODIES AND HOISTS

MARION METAL PRODUCTS CO., MARION, OHIO, U. S. A.

A complete line of standard and special hydraulic hoists and dump bodies to fit every need.

Donald C. Kilpatrick has been appointed parts sales promotion manager by the Koehring Company of Milwaukee, Wis., manufacturer of heavy-duty construction equipment. He will work out of the firm's main office in Milwaukee.

Since 1955, Mr. Kilpatrick has held a district representative post covering eight states and several Canadian provinces for Koehring and three of its subsidiary manufacturing firms. He joined the Koehring Company sales department staff in 1953.

After spending 18 months as a serviceman for a major manufacturer of diesel engines, he enrolled at Iowa State College. He was graduated in 1950 and immediately became associated with a construction equipment distributor in Cedar Rapids, Iowa. He also did sales work for a crushing equipment manufacturer in Iowa for a short time before becoming associated with Koehring.

D. C. Kilpatrick

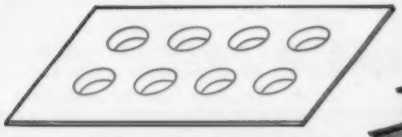
S. E. Danby

Stewart E. Danby has been appointed a district representative by the Koehring Company. He will represent Koehring as well as three of its subsidiary manufacturing firms, Parsons Company of Newton, Iowa; C. S. Johnson Company of Champaign, Ill., and Kwik-Mix Company of Port Washington, Wis.

The territory to be covered by Mr. Danby includes North and South Dakota, Nebraska, Iowa, Colorado, southern Wyoming, Minnesota, Kansas and western Missouri. He spent several years as a civil engineer with the Milwaukee Road before becoming associated with Koehring.

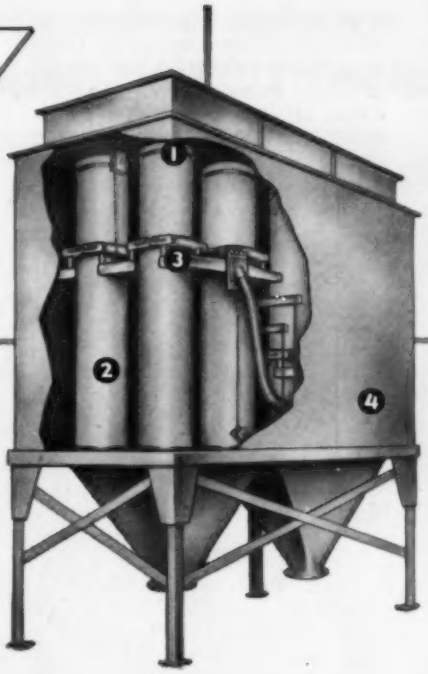
Southern Tire Company, specialists in giant tire recapping and service, announces the removal of its operations from Florence to new and expanded quarters at 1414 Broadway, in Sheffield, Ala. J. W. Gaskins is one of the owners of the company and sales manager.

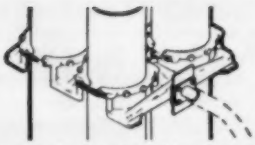
Southern Tire's new telephone number in Sheffield is 4740. All correspondence and contact with the company should be directed to the new address.



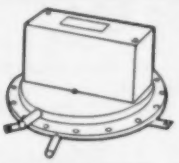
1 Air enters plenum casing at top of Series 12 Aeroturn for equal distribution to all filter bags. Bags are of felt . . . with higher filtering efficiency than woven material. Tiny pores hold even submicronsized dust particles. Cloth area is less than ⅛ that of shaker bags.

2 The air travels downward through the filter bags, assists delivery of dust into hoppers below... escapes through bag walls. Even distribution of dust puts every square inch of the filtering surface to work... avoids clogging... permits air to escape easily.



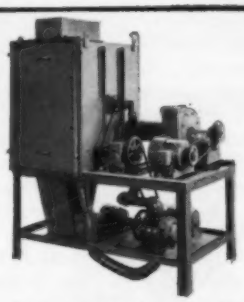


3 Self-adjusting blow rings* travel length of filter bag exterior . . . discharge reverse-air-jet into bag which blows accumulated dust off bag walls. Cleaning never interferes with filtering... which maintains peak efficiency. Aeroturn remains on the job continuously.



4 Automatic pressure switch* controls blow ring operation. Above normal pressure loss automatically actuates blow rings. When pressure loss normalizes, blow rings stop operation. Self-cleaning occurs as often or as little as needed . . . avoids over-cleaning.

Up to 75% Lower Installation Costs—99.9%+ Efficiency with KOPPERS Series 12 Aeroturn Dust Collectors!



Factory-assembled and test-operated, Koppers Model D Aeroturn Dust Collector combines features of Series 12 with unusual compactness. Capacities range from 500 to 4,800 CFM.

50% Lower Maintenance Costs . . . Up to 50% Less Space!

Aeroturn's remarkably high filtering efficiency slashes your plant and machinery maintenance costs further than can any other dust collector. Heating and cooling costs tumble because air can be recirculated . . . cleaner than outside air. Employee and community relations are improved. Yet Koppers Series 12 Aeroturn costs you less to install . . . less to maintain. Space requirements are far smaller.

Operation is continuous and automatic . . . without a drop in peak efficiency due to cleaning. Pre-fabricated Koppers Series 12 Aeroturn ranges in capacity from 1,000 to 60,000 CFM . . . contains from 4 to 64 filter bags each 12″ in diameter and up to 18′ in length.

It takes only a few minutes of your time to discover how Koppers Series 12 Aeroturn may save you thousands of dollars.

AEROTURN DUST COLLECTORS

KOPPERS®

Koppers Company, Inc.
Metal Products Division
Industrial Gas Cleaning Dept.

***Engineered* Products**
Sold with *Service*

Mail this coupon today!

KOPPERS COMPANY, INC., Industrial Gas Cleaning Dept., 4509 Scott Street, Baltimore 3, Maryland.

Gentlemen: Please send me a free copy of your Aeroturn booklet with descriptions, drawings and photographs. ☐ Series 12 ☐ Model D

Name..... Title.....

Company.....

Address.....

City..... Zone..... State.....

*Hersey Patents

Dorr-Oliver, Inc., Stamford, Conn., announces the appointment of John J. Round, Jr., of Wakefield, Mass., as its exclusive representative for industrial pumps in the six New England states. In this capacity Mr. Round, a manufacturers' representative, will handle the complete line of D-O industrial pumps available to the process industries of New England. All pumps and repair parts marketed by the new representative will be immediately available from stock maintained at Dorr-Oliver's Hazleton, Penn., manufacturing center.

Mr. Round is widely experienced in the field of industrial pumping. He was formerly employed by both Fairbanks Morse & Co. and Goulds Pumps, Inc.

Bell Aircraft Corporation, Buffalo, N. Y., announces the formation of the Bell Automation Corporation, a new wholly-owned subsidiary in Rochester, N. Y., which will specialize in the field of automatic controls and systems. First product to be introduced is the Electro-Way, an electronically controlled, continuous weighing system for the conveyor belt handling of bulk materials. Installations have been made in a number of industries including cement, gypsum and power plants.

Officers of the new corporation are president, Leston P. Faneuf, vice-president and general manager of Bell Aircraft; vice-president, Terence M. Nolan, manager of product planning, Bell Aircraft, and secretary and treasurer, William G. Gisel, who is secretary and comptroller of the parent company.

F. L. Munger, vice-president in charge of sales of Kraft Bag Corporation, New York, N. Y., manufacturers of multi-wall bags, announces the appointment of Joseph J. McDermott to the sales staff. He will represent the company in Metropolitan Chicago, northern Illinois and in Michigan, operating out of Kraft Bag Corporation's Chicago office.

Mr. McDermott, who has more than 20 years' experience in the bag business, was previously associated with Fulton Bag & Cotton Mills, in the Chicago area.

J. W. Bloomquist, domestic sales manager of Euclid Division, General Motors Corporation, Cleveland, Ohio, has announced the appointment of L. H. Brannian as a district sales representative in the Central Region managed by Everett C. Dellen.

Henry H. Platek has been appointed advertising manager of the Cleveland Worm & Gear Co. and its affiliate, the Farval Corp., Cleveland, Ohio. He joined the sales department, C.W.G. and Farval, in 1945 and served subsequently as assistant sales supervisor and assistant advertising manager.

J. C. Baseheart is engine sales manager, and F. M. Borwell is assistant engine sales manager of the Buda Division, Tractor Group, Allis-Chalmers Mfg. Co., with headquarters at the home office in Milwaukee, Wis. Mr. Baseheart was in charge of engine sales and Mr. Borwell was special district representative, engine sales, for the Buda Division, Harvey, Ill.

L. A. Davis, vice-president and district sales manager, since 1945, of the Stulz-Sickles Co., Newark, N. J., died recently. He was 56. Previous to his association with the Stulz-Sickles Co. in 1945, he was active in the reclamation welding industry and was a Manganal distributor, where he used his wide, practical knowledge of applications.

Stan Fain has been appointed advertising supervisor for R. G. LeTourneau, Inc., of Longview, Texas, and will be responsible for magazine space advertising, direct mail, promotional literature, and coordination of the Advertising Division's production activities.

C. M. O'Donnell, who has been with Blaw-Knox Company, Pittsburgh, Penn., since 1923, has been named assistant manager of the grating department in charge of bridge decking. In this capacity, he will spearhead Blaw-Knox sales of bridge decking to the construction industry. Starting with Blaw-Knox as a draftsman, Mr. O'Donnell became a grating sales engineer in 1936.

In a reorganization to enlarge the scope of the design department at Bailey Meter Company, Cleveland, Ohio, Cornelius J. Hes and Michael Panich have been appointed assistant managers to T. A. Green, manager of the department.

The design department has been divided into two groups with Mr. Hes in charge of special design and Mr. Panich in charge of product design.

Atlas Powder Company, Wilmington, Del., has announced the formation of a new sales development section in its Explosives Sales Department. Heading the new section is William T. Mahood, formerly manager of the department's contractors' section.

Assigned to the new group are John L. Romig, as quarry and metal mining industry manager; John M. Jeffries, coal mining and stripping industry manager; John W. Cochran, seismograph industry manager, with headquarters at Joplin, Mo.; and Joseph H. Dannenberg, sales promotion and advertising manager.

Mr. Mahood, who is well known in the construction industry, joined Atlas as an explosives salesman in Houghton, Mich., in 1936, and later served as district sales manager in Seattle and in San Francisco.

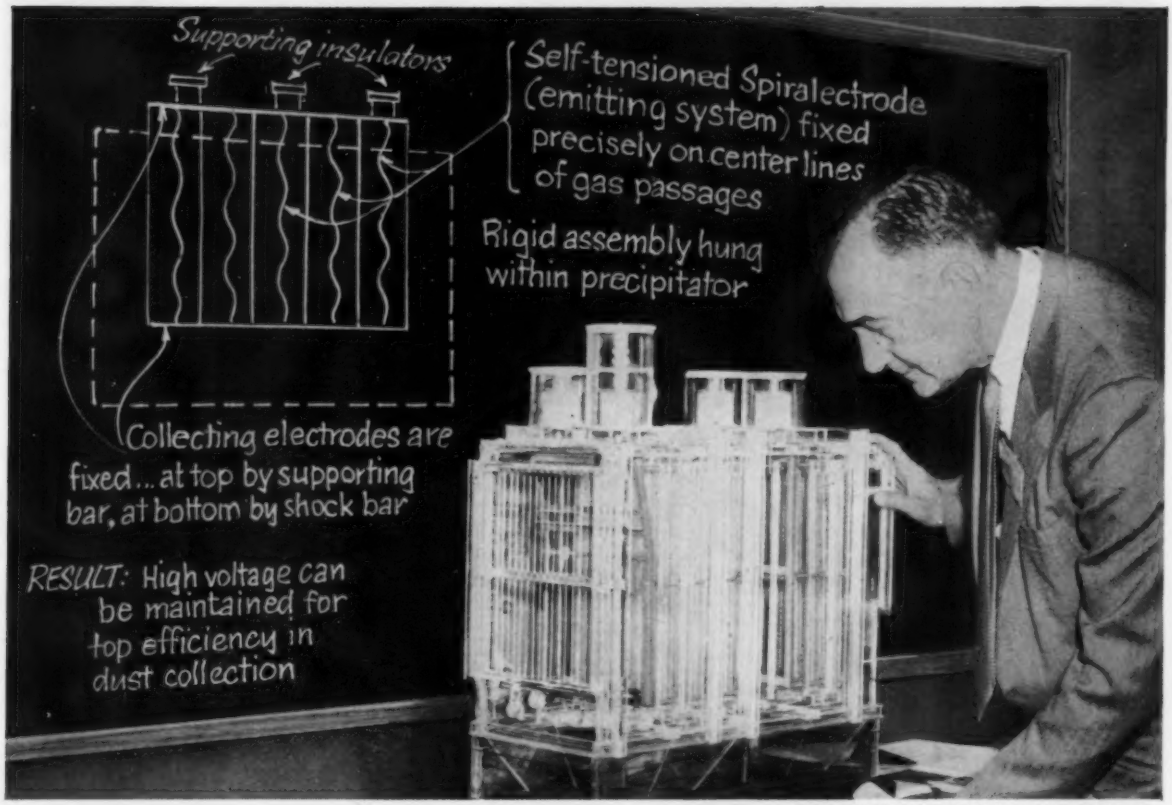
Also announced is the appointment of James R. Caldwell, formerly sales agent at Houston, Texas, as assistant to the manager of the Joplin, Mo., explosives sales district. Mr. Caldwell will continue to make his headquarters in Houston. Succeeding him as sales agent is Milton A. McDuff, formerly a salesman in the Joplin district. Mr. McDuff has been assigned to the Houston area for several years.

Western Precipitation Corporation, Los Angeles, Calif., announces that Marshall, Neil & Pauley, Inc., have been appointed agents for the sales of the company's Multiclone and Dualaire products in most of Texas. They are well-known in the Gulf Coast area and are equipped to provide excellent sales coverage throughout Texas from strategically-located offices in Houston and Dallas (plus a third office in New Orleans).

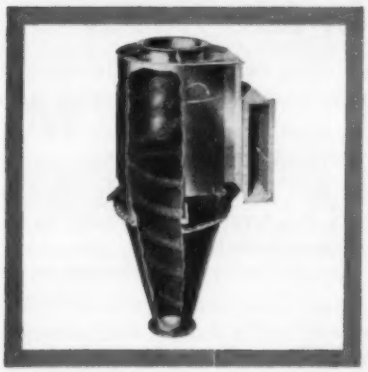
As agents for Multiclone and Dualaire equipment in Texas, Marshall, Neil and Pauley will operate under supervision of Western Precipitation's District Offices in Atlanta, Ga. District sales manager for the Atlanta Office is Mr. K. H. Cree, with Mr. Gilbert C. Schneider serving as associate sales engineer.

Tage Josson, vice-president of Vibro Plus Products, Inc., of Stanhope, N. J., announces the appointment of Edward Zucker as assistant sales manager. Mr. Zucker will also supervise the sales promotion activities of the company. He was formerly assistant general manager of Water Service Laboratories and an engineer with Loewy Construction Corp.

How fixed electrodes assure top efficiency in a Buell "SF" Precipitator

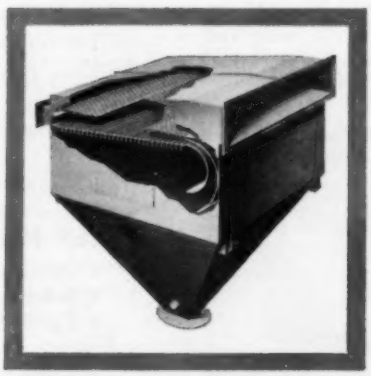

Supporting insulators
Self-tensioned Spiralectrode (emitting system) fixed precisely on center lines of gas passages
Rigid assembly hung within precipitator
Collecting electrodes are fixed... at top by supporting bar, at bottom by shock bar
RESULT: High voltage can be maintained for top efficiency in dust collection

PHOTOGRAPH OF BUELL PLASTIC MODEL BY INDUSTRY & POWER



Buell Cyclones also assure top efficiency with large diameter design to eliminate clogging . . . and by harnessing double-eddy and putting it to work.

Even when high-resistivity dusts must be collected, top efficiency is guaranteed by the exclusive shape of Buell's Spiralectrodes—proved to give 50-100% greater emission than straight wires. Exclusive Continuous Cycle Rapping virtually eliminates maintenance by keeping electrodes constantly clean.



Buell's Low Resistance Fly Ash Collector combines top efficiency to meet present strictness, with low draft loss for natural or mechanical installations.

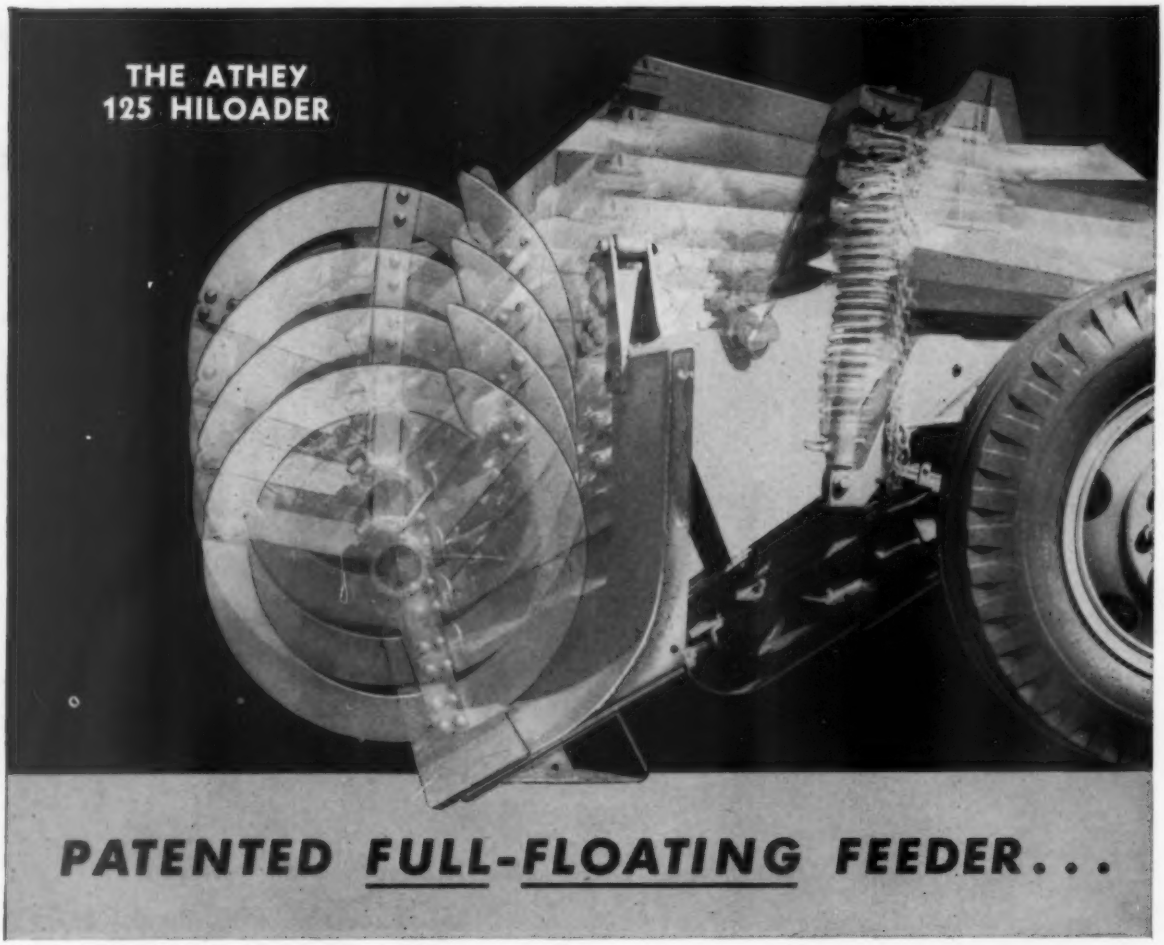
GET ALL THE FACTS

Write to:
Buell Engineering Company,
Dept. 18-I, 70 Pine Street,
New York 5, New York

buell

MECHANICAL ELECTRICAL

Experts at delivering Extra Efficiency in **DUST COLLECTION SYSTEMS**



secret of the fastest loader in the field!

We stopped the exclusive Athey Full-Floating Feeder in motion to show you the principle that makes the 125 HiLoader the leader in the loading field! You can see how the spring-suspended feeder floats freely, rising and falling with the contour of the windrow or stockpile.

Feeder blades automatically adjust to any material . . . rock, dirt, gravel, broken pavement, quarry materials . . . permitting it to flow onto the fast moving belt.

Extra large throat opening cannot restrict the material; allows steady, uniform loading without plugging up or slowing down.

The full-floating feeder is but one of many reasons why more successful men with a tough materials handling problem specify the Athey 125 HiLoader to cut their costs and boost their profits!

ATHEY HILOADER

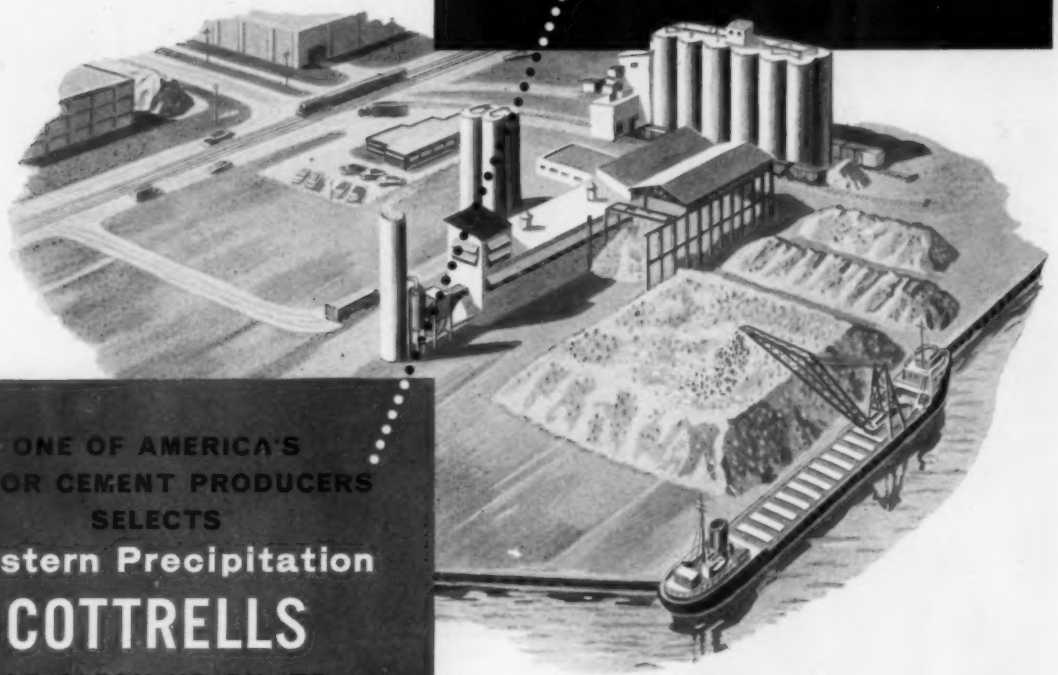
- Loading capacity up to 10 cu. yds. per minute
- Swiveling conveyor speeds truck spotting
- Travels from job to job at 20 M.P.H.

Athey

ATHEY PRODUCTS CORPORATION
5631 West 65th Street, Chicago 38, Illinois

Downtown location makes clean-up job particularly critical

MARQUETTE Cement



ONE OF AMERICA'S MAJOR CEMENT PRODUCERS SELECTS

Western Precipitation COTTRELLS

FOR CLEAN-UP ON ITS NEW MILWAUKEE PLANT

Marquette Cement is pioneering a new era in cement plant design—the first U.S. installation of the Allis-Chalmers-Lepol (A-C-L) process—at a waterfront location in downtown Milwaukee. The plant is designed for unusually compact space requirements, low fuel consumption, and the extremely high degree of cleanliness necessary for its downtown location.

For this new process where maximum cleanliness is essential, the problem of final clean-up was assigned to the organization that has more know-how, more widespread experience in recovering dusts, fume and fly ash from industrial gases than has any other organization in the industry – Western Precipitation Corporation.

Moreover, for another large plant it is building at Cape Girardeau, Mo., Marquette has selected Western Precipitation COTTRELLS and MULTICLONES for the critical clean-up work there.

Whatever *your* recovery problem in controlling dust, fume, fly ash or other suspensions, bring it to the organization that has had years of first-hand field experience in all phases of such operations... *electrical* (COTTRELL Precipitator)... *mechanical* (MULTICLONE Collector)... *combination electrical-mechanical* (CMP) ...and *filter* (DUALAIRE).

Western Precipitation can provide these installations on a complete "turnkey" basis—or can supply the basic equipment, as desired. This unequalled "know-how" is as close as your telephone in all of the nation's major industrial areas!

COTTRELL Electrical Precipitators
MULTICLONE Mechanical Collectors
CMP Combination Units
DUALAIRE Reverse-Jet Filters
HOLO-FLITE Processors

Western Precipitation Corporation

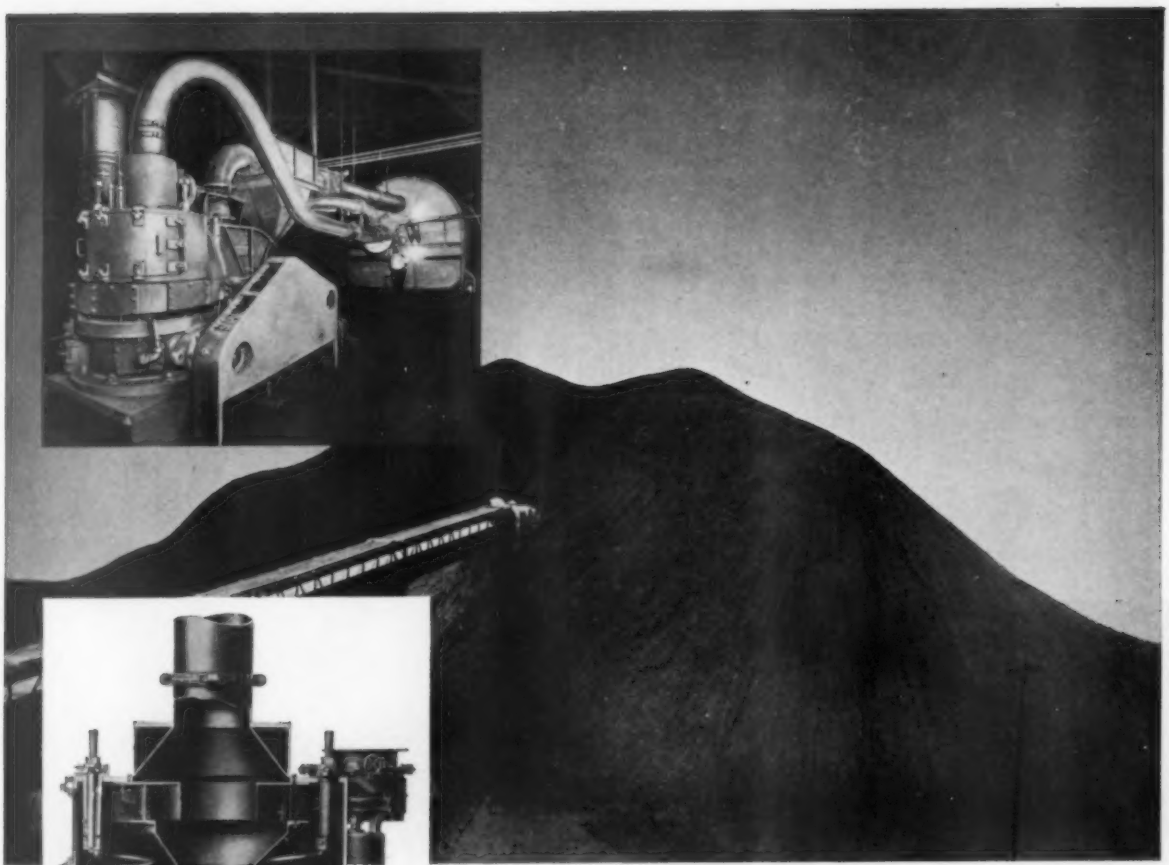
Designers and Manufacturers of Equipment for Collection of Suspended Material from Gases ... and Equipment for the Process Industries

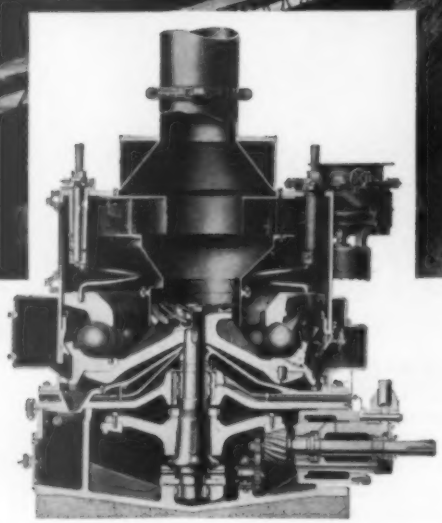
Main Offices: **1015 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA**

Chrysler Building, New York 17 • 1 North La Salle Street Building, Chicago 2 • Oliver Building, Pittsburgh 22 • 3252 Peachtree Road N. E., Atlanta 5 • Hobart Building, San Francisco 4

Precipitation Company of Canada Ltd., Dominion Square Building, Montreal

Representatives in all principal cities





IN THE **LONG RUN**
...B&W Type EL Pulverizers

Wherever these "extended engagement" pulverizers are used for direct-firing of rotary kilns they have established long and impressive performance records.

BECAUSE:

1. Grinding zone has no bearings or parts to be lubricated.
2. No internal adjustments are required.
3. Grinding elements are made of wear-resistant, long-life metals, with grinding balls held to close spherical tolerances.
4. Fully-enclosed reduction gear drive, with anti-friction bearings, and integral pump for automatic pressure lubrication.
5. Tramp iron and pyrites are automatically rejected, usually without interruption of service.

These qualities plus many years of manufacture and application combine to give you constant, high-level service for modern kiln operation. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

BABCOCK & WILCOX

BOILER DIVISION

C-212

Satisfied customer Art Martinson (right), president of Denver's Kitimat Corporation, and Phil Smith, Mack salesman. There's real friendship between these two—and no wonder! Mack diesels are giving Kitimat . . .

100% more fuel mileage

The Martinson Construction Company of Denver, Colorado, leases a fleet of trucks from the Kitimat Corporation. Originally, the trucks were gasoline-powered units averaging 3½ to 4 miles per gallon—real "profit killers." Today, Kitimat operates Mack diesels exclusively and averages 8 miles per gallon—for a saving in fuel costs of more than 100%.

As Kitimat president Art Martinson says, "In 1952 we bought our first Mack diesel and got a real lesson in truck economy and performance. Today, we are 100% Mack—12 mixers, 6 dumpers, and 2 tractors. The fuel savings alone more than justify the higher initial cost of the Macks. Just as important, our Macks give us dependable service, bonus capacities, and lower maintenance costs with a really gratifying minimum of down time."

Why not cut hauling costs and boost your profits with Macks—trucks that are unmatched for operating economy, stamina, and low maintenance? Like other operators, you'll find that you can't afford *not* to operate Macks. For complete information, contact your local Mack Branch or Distributor. Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd.

• • •

MACK
first name for
TRUCKS

3707

EXTRA STABILITY

for high-speed spreading on rough grades, soft fill!

Andy's Trucking Service, Miami, Florida, uses GC-2 dump bodies and A-260 Strong Arm hoists to speed work on 2000-home subdivision in Hialeah. Contractor has 3-mile haul from quarry to project; spreads 17-ton loads of limestone fill at high speeds.

Strong Arm design ends one-sided dumping strain

Gar Wood-St. Paul hoists are noted for extra stability when dumping unevenly loaded bodies on rough grades and soft fill. Exclusive Strong Arm design makes the difference! A massive torque tube converts the thrust of twin cylinders to equal lifting power on both sides of dump body, regardless of load distribution or dumping angle. As a result, there's no one-sided dumping strain . . . hoist, body and truck frame last longer, operate more smoothly.

Rugged Gar Wood-St. Paul dump bodies are built to stand up under the pace and punishment of today's tight construction schedules, too. They're stress-tested to put strength where it's needed, eliminating excess weight. Matched with Strong Arm hoists, they'll deliver the payloads you need, *when* you need them and at a lower net cost per payload hour.

Your Gar Wood-St. Paul truck equipment distributor can give you all the reasons why this advanced line is preferred by contractors who bid the big ones. Give him a call, or write to: Customer Service Dept., Gar Wood Industries, Inc., Wayne, Michigan.

GAR WOOD INDUSTRIES, INC.

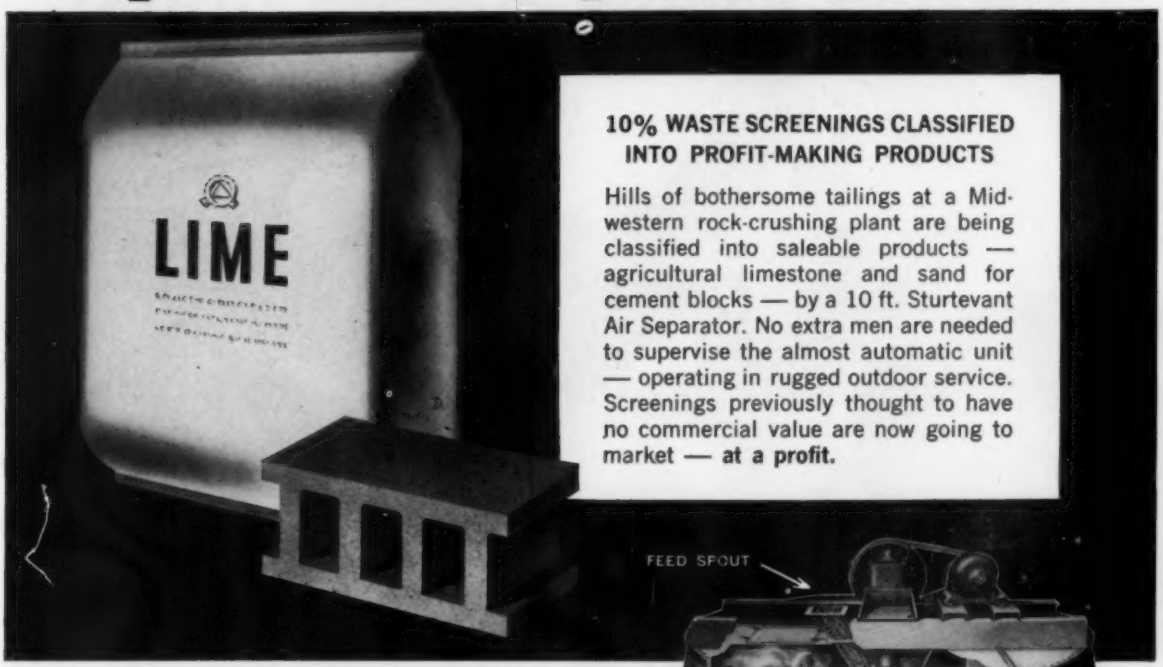
Wayne, Michigan • Richmond, California

Plants in Wayne and Ypsilanti, Mich.; Findlay, Ohio; Mattoon, Ill.; Richmond, Calif.

Gar Wood-St. Paul

Gar Wood Excavators | Gar Wood Winches | Gar Wood Tractor Equipment | Gar Wood-Buckeye Ditchers

Tailings Go to Market - Separated by Sturtevant



10% WASTE SCREENINGS CLASSIFIED INTO PROFIT-MAKING PRODUCTS

Hills of bothersome tailings at a Mid-western rock-crushing plant are being classified into saleable products — agricultural limestone and sand for cement blocks — by a 10 ft. Sturtevant Air Separator. No extra men are needed to supervise the almost automatic unit — operating in rugged outdoor service. Screenings previously thought to have no commercial value are now going to market — **at a profit.**

THE SEPARATOR THAT UPPED 40 TO 400 MESH OUTPUT AS MUCH AS 300%

Sturtevant Air Separators range from 3 to 18 ft. in diameter: deliver fines from 40 to 400 mesh at rates as high as 65 tons per hour . . . in the cement industry, have a tested record of increasing mill capacities from 25 to 300% while lowering power consumption as much as 50% — when used in closed circuit with grinding mills.

Designed to cut costs and build profits, Sturtevant Air Separators give a lifetime of high-efficiency, low down-time service. Rugged construction plus easy accessibility for quick maintenance (typified by the "Open-Door" design in other Sturtevant equipment) assure more output per machine year.

Write today describing your problem. Please include information on material, process and desired capacity.

Address: Sturtevant Mill Company,
104 Clayton St., Boston 22, Mass.

What Can a Sturtevant Air Separator Do in Your Pulverizer System?

Controlled centrifugal whirl by balancing forces separates rapidly, efficiently, cement, lime, clay, talc, ceramics, refractories, phosphates, coal and many other materials. Also used for selection of pigments, limestone, fillers, plastics, oyster shells and abrasives. Write for Sturtevant Bulletin No. 087.

STURTEVANT
Dry Processing Equipment

The "OPEN-DOOR" to *lower* operating costs over *more* years

CRUSHERS • GRINDERS • MICRON-GRINDERS • SEPARATORS
BLENDERS • GRANULATORS • CONVEYORS • ELEVATORS

Manitowoc 2½ yd. Shovel Loads 22 Tons of Crushed Rock Every 82 Seconds!

Also Feeds Crusher At Rate of 4000 Tons in 10 Hr. Shift

Nelson Bros. Quarry, La Harpe, Kansas, supplied an estimated 400,000 tons of crushed stone for an eight mile section of the Kansas Turnpike near Emporia. All of the rock, both before and after crushing, was handled by Nelson Bros.' 2½-yd. Manitowoc shovel. This unit fed 4000 tons of rock into the crusher every 10 hour shift—and filled hauling units to 22 tons capacity in one minute, 22 seconds. The Manitowoc was also used for stripping top-soil off rock beds and is now working in a 24′ ledge of rock in the quarry.

Boost Your Output

Every Manitowoc is a *powerhouse in the pit!* Call your Manitowoc Distributor now for the complete, profitable story.

"Plenty beefy for quarry work . . ."

"Our Manitowoc is plenty beefy for this quarry work," said Mr. Carl Nelson. "We've got good service from this machine. We like it well enough that we're thinking of another one."

". . . easy to operate . . ."

Operator Allen Stokes commented, "I know the shovel can load even faster. It is easy to operate and beats anything I've been on. I like the way it handles when I move it, and its fast swinging speed. We have had no major repairs."

MANITOWOC

SHOVELS 1 - 5½ YD. Speed Crane CRANES 20-100 TON

PERFORMANCE REPORT ON AMERICA'S BEST SELLING TRUCKS:

"WE ORDERED 10 CHEVY TANDEMS . . . ONE OF THE MOST PROFITABLE MOVES WE'VE EVER MADE!"

. . . says Mr. F. Roland Sargent, Sargent Construction Company, Saginaw, Michigan—a typical user of Chevrolet heavy-duty trucks.

"After sizing up these new models . . . we ordered 10 of them. *And let me say it has been one of the most profitable moves we've ever made.* During the wet spring this year, we had conditions on a job near Bay City which were worse than our firm has ever operated in . . . I honestly didn't think any truck could plow through that sea of wet, oozy muck. But we decided to make a try. When those Chevy tandems went in, the mud sucked them down on their axles . . . sometimes two-thirds of the wheels were actually buried . . . those trucks were literally crawling on their bellies. But they kept rolling. And, to my amazement, we didn't even have to lighten the nine-ton loads!

"Let me sum up by putting it this way. We've put in a new order to enlarge our Chevrolet tandem fleet."

Why not see *your* dealer soon? . . . Chevrolet Division of General Motors, Detroit 2, Mich.

***Modern features* make new Chevrolet trucks the Performance Champs of the Heavyweight Class!**

New short-stroke 195-hp Loadmaster V8 powers Chevrolet top-tonnage trucks!

New Powermatic* — the first automatic transmission designed specially for big trucks!

New Triple-Torque Tandems hike G.V.W.'s to 32,000 lbs., G.C.W.'s to 50,000 lbs.!

Spicer 5-speed transmission† for extra pulling power, improved economy.

*Optional, extra cost, Series 5000 through 10000 models.
†Optional, extra cost, Series 9000 and 10000 models.

CHEVROLET

NEW CHEVROLET TASK·FORCE TRUCKS

Anything less is an old-fashioned truck!

FOR

Steadier Arc

Steadier Voltage

Smoother, Faster Application

USE

VICTOR

Automatic Rods

Victor automatic hardfacing alloys go on 3 to 4 times faster than manually-applied hardfacing, enable you to make big savings in labor costs. And if you're repairing equipment, cutting down time by ⅔ or ¾ likewise is a terrific saving. You get a more uniform deposit, too, from Victor automatic hardfacing alloys, resulting in longer, more even wear. Check this chart — you'll find there's a Victor type for every hardfacing need.

Learn for yourself how hardfacing with Victor automatic rod reduces labor and repair down time. Ask your Victor dealer for Bulletin 358 — or better yet, order a coil of rod NOW and try it on your job.

PROFITABLE DEALERSHIPS OPEN; INQUIRE NOW!

33

VICTOR EQUIPMENT COMPANY

ALLOY ROD AND METAL DIVISION

Los Angeles 59, California • Wakita, Oklahoma

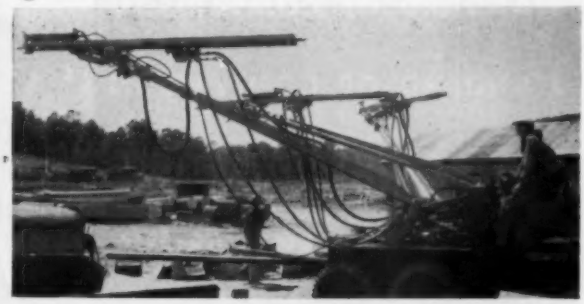
Note even deposit of Victor VA#3 automatic rod on gyratory crusher cones.

TYPE	USES	PROPERTIES AND APPLICATION
VA#1	Crusher Rolls Gyratory Crushers Crusher Mantels Scraper Blades	Rockwell 'C' 54-57 Impact Resistance—good Abrasion Resistance—high AC-DC submerged arc or DC open arc
VA#2	Pinch Rolls Tractor Idlers Tool Joints Coiler Rolls	Rockwell 'C' 50-52 Impact Resistance—good Abrasion Resistance—good Submerged arc only Suitable for multiple passes
VA#3	Roll Crushers Gyratory Crushers Impellors Mill Guides	Rockwell 'C' 54-57 Impact Resistance—good Abrasion Resistance—high For use where abrasion is severe Submerged arc only
VA#4	Tractor Rollers Sheave Wheels Tractor Idlers	Rockwell 'C' 25-28 Impact Resistance—excellent Abrasion Resistance—good Submerged arc only Suitable for multiple passes Machineable
VA#5	Tractor Rollers Sheave Wheels Tractor Idlers Grader Blades	Rockwell 'C' 34-38 Impact Resistance—high Abrasion Resistance—good Suitable for multiple passes Submerged arc only
VA#6	Crane Wheels Roll Necks Pump Sleeves	Rockwell 'C' 38-41 Impact Resistance—high Abrasion Resistance—fair Suitable for multiple passes Deposit machineable Submerged arc only
VA#7	Excellent base for high alloy application. Mine Car Wheels	Rockwell 'C' 36-42 Impact Resistance—excellent Abrasion Resistance—good Suitable for multiple passes Deposit machineable Submerged arc only
VA#8	Tool Joints Grader Blades Scraper Blades Roll Crushers	Rockwell 'C' 51-54 Impact Resistance—high Abrasion Resistance—high Submerged arc only
VT#60	Tool Joints Grader Blades Scraper Blades	Automatic Tungsten carbide wire Abrasion Resistance—excellent (maximum) Deposits are heterogeneous Open arc—DC reverse only

Rod diameters 1/8", 5/32" and 3/16". Standard coil size, 22-1/2" inside diameter, 4" wide, approximate weight 100 lbs.

Gardner-Denver . . . Serving the World's Basic Industries

Self-propelled "Air Trac"® drill for rough terrain.



Hydraulic booms and remote-controlled drills for mounting on tractor truck or half-track.

New 5½" heavy-duty rock drill on self-propelled crawler.

All-weather rotaries in 600-foot and 900-foot capacities.

Long-feed tunnel drills and hydraulic booms.

Cost-saving tools for the big push

When you come to rock . . . come to Gardner-Denver for cost-cutting rock drill equipment. Ask for bulletins.

GARDNER - DENVER

THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

There's a Gardner-Denver distributor in your area—
see him for details

STANDARD OF COMPARISON

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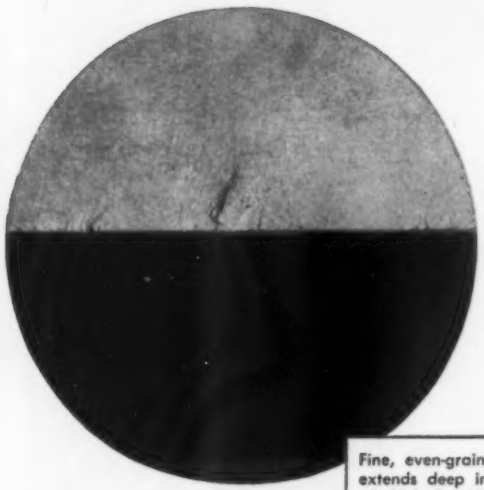


Fine, even-grained structure extends deep into the core of Moly-Cop Ball to give long, even wear.

STANDARD of COMPARISON

FOR OVER 20 YEARS

SHEFFIELD

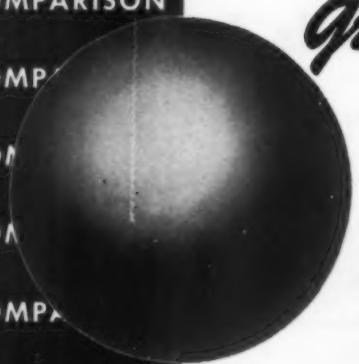
ARMCO®

MOLY-COP

TRADE MARK

COPPER-MOLYBDENUM-ALLOY

Grinding Balls



SHEFFIELD STEEL

DIVISION

ARMCO STEEL CORPORATION

SHEFFIELD PLANTS: HOUSTON • KANSAS CITY • TULSA

MORE POWER ~~to~~ *for* YOU!

How the EXTRA POWER in the NEW BAY CITY ONE YARD SHOVEL HELPS YOU

260

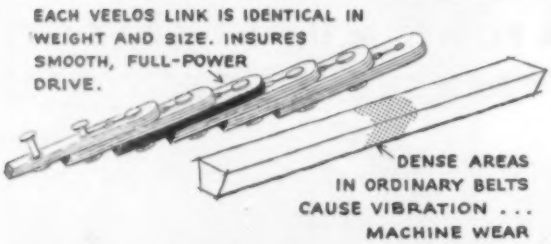
The *greater power* and greater strength built into the new heavy-duty BAY CITY one yard-shovel results in smoother, faster operation for you. There's *greater power in the engine:* a big 113 H.P. Diesel assures you of the ability to get in and out of tough places, to dig hard materials with ease, and to maintain a fast, smooth digging cycle. *Power steering* through cone clutches which actuate brakes, gives you superior maneuverability: you can make sharp or gradual turns in either direction while the machine is in full motion . . . you don't have to stop to throw out jaw clutches or set steering brakes. *Power Boom Hoist* on the BAY CITY raises and lowers boom always under power, and the *Power Dipper Trip* makes dumping much easier and much faster. In addition, the BAY CITY has *Power Booster Clutches* which take fatigue out of operating and give you bigger yardage. Put this powerful BAY CITY to work. Get further information today, from your local dealer or write the factory for Bulletin 60B.

BAY CITY SHOVELS INC. • BAY CITY, MICHIGAN

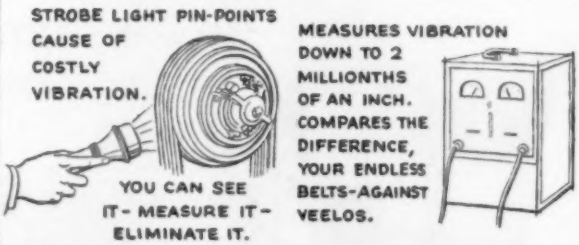
BAY CITY

SHOVELS • CRANES • HOES • DRAGLINES • CLAMSHELLS

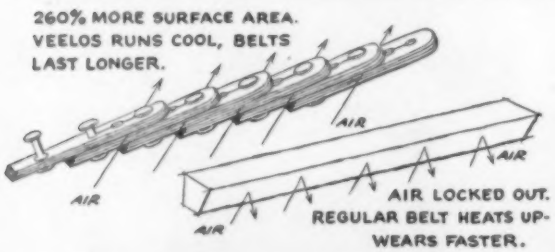
Six Reasons Why Veelos Adjustable V-Belts Are Better For Your Drives!


EACH VEELOS LINK IS IDENTICAL IN WEIGHT AND SIZE. INSURES SMOOTH, FULL-POWER DRIVE.
DENSE AREAS IN ORDINARY BELTS CAUSE VIBRATION . . . MACHINE WEAR

1. Balanced construction of Veelos Belts assures you faster, cleaner work, less rejects . . . less bearing wear. Each link and stud is identical in size and weight. Ordinary belts have varying spots of density which cause excess vibration—chatter marks, machine wear.


STROBE LIGHT PIN-POINTS CAUSE OF COSTLY VIBRATION.
YOU CAN SEE IT - MEASURE IT - ELIMINATE IT.
MEASURES VIBRATION DOWN TO 2 MILLIONTHS OF AN INCH. COMPARES THE DIFFERENCE, YOUR ENDLESS BELTS-AGAINST VEELOS.

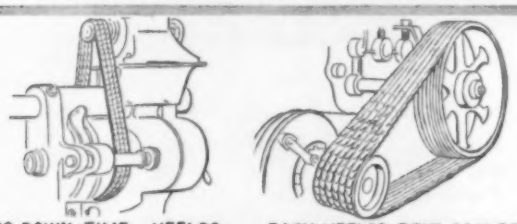
2. Electronic proof—up to 90% less vibration! With a vibration analyzer, you see, on your own machine, how Veelos belts decrease vibration up to 90% over any belt you're now using. This amazing Veelos test pin-points the belt that has the "invisible shakes."



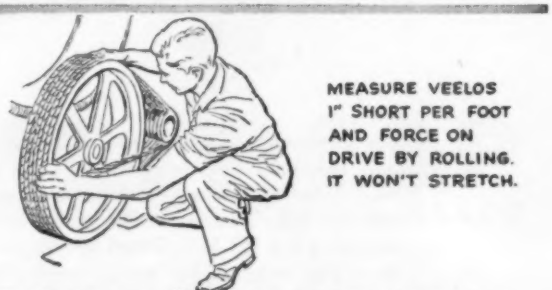
3. Cooler running—long life! Veelos breathes! Constant circulation of air keeps Veelos running smooth. Regular V-belts have no chance to cool, heat builds up from the inside . . . causes slippage, wastes power, heats bearings, reduces belt life.

AREA CONTACT
POINT CONTACT
PERFECT VEELOS FIT. EXTRA THICKNESS AND MACHINE-CUT SIDES PREVENT BOTTOMING. MEAN CONSTANT POWER.
POWERLESS POINT CONTACT OF ORDINARY V-BELT. BULGES, SLIPS, CAUSES UNEVEN SHEAVE WEAR.

4. Greater flexibility reduces slippage! Sectional construction, beveled links allow greater flexibility, longer belt life. Each link moves around sheave independently and maintains full contact, constantly. Full area contact allows shorter centers, smaller sheaves.

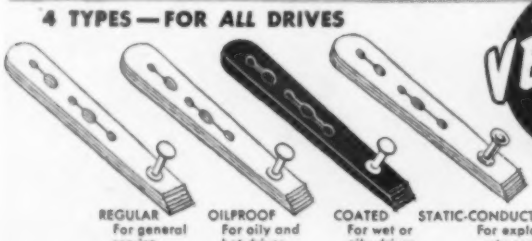

NO DOWN-TIME. VEELOS FITS ANY DRIVE - WITHOUT DISMANTLING.
EACH VEELOS BELT CAN BE ADJUSTED - NO NEED FOR EXPENSIVE MATCHED SETS.

5. Simple installation "knocks out" down-time! Saves up to 50% installation time on outboard bearing drives, more when belt length isn't in stock. No resetting, tilting or moving motors. Veelos can be made any length, can be changed by adding or removing links.



6. Veelos won't stretch any more than ordinary endless V-belts when it is properly installed. *Remember—measure Veelos 1" short per foot and roll on drive as tightly as possible.* With the first few revolutions Veelos studs accept a permanent set into the sections they connect.

4 TYPES — FOR ALL DRIVES


REGULAR For general service
OILPROOF For oily and hot drives
COATED For wet or oily drives
STATIC-CONDUCTING For explosive atmosphere

VEELOS
THE BALANCED LINK V-BELT
Known as Veelink outside U.S.A.

For all sizes and types of drives. Double-V available for serpentine drives.

Write for free Veelos Data Book or Veelos Vibration Demonstration to:

MANHEIM
Manufacturing & Belting Co.
412 Stiegel St., Manheim, Pa.

"Industrial Belt Specialists Since 1911"

© M.M.&B. Co. 1956

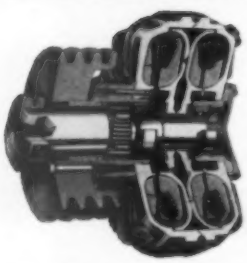
Quarry Production Up Because . . .

OPERATOR EFFORT IS REDUCED 50%

An excavator, even an American, is only as good as its operator! If he's "beat" after a few hours at balky controls your profits are suffering as much as his muscles. American 300 Series Cranes—like this dragline owned by George W. Parfet Estate Inc., Golden, Colorado—are easy to operate and here's why: Anti-friction bearings in the brake linkage system cut operator effort up to 50%! This means only half as much "push" is needed on the foot pedals. It means faster release with better control when lowering the load. No more sudden stops that jar the entire machine. Heavy duty 300 Series Cranes give top production and bigger profits because they swing and cycle faster —smoother. Trouble-free performance is assured by excellent design—strict quality control from start to finish!

For the whole American story, see your American Distributor. For your job, see his line of American crawler and rubber mounted cranes in capacities from ½-yard up.

AMERICAN HOIST
and DERRICK COMPANY
St. Paul 1, Minnesota



Convert to FLUID drive in only *5 MINUTES!*

Fluid drive in a package . . . complete, ready-to-install . . . slips right over the motor shaft, easily in a matter of minutes. That's the Twin Disc HYDRO-SHEAVE® Drive—compiling new records for high production and low equipment maintenance.

Here's what the HYDRO-SHEAVE does

1. Reduces starting current demands . . . provides smooth, fast motor acceleration.
2. Protects against motor overloads, stalling and burn-outs.
3. Transmits full motor torque at all speeds.
4. Cushions out destructive vibrations and shocks, protecting both driving and driven equipment.
5. Permits motor selection based on running load rather than starting load.

Twin Disc Fluid Drives are available as HYDRO-SHEAVE Drives, from ¾ to 50 hp; Fluid Couplings from ¾ to 850 hp; and HYDRO-WYND® Drives, Models 8.4 and 12.2 for winding and tensioning.

Write today for full details on these profitable fluid drives. See how easily they will solve your power transmission problems. Request Bulletins 144-D and 145-C, from Dept. DS, Racine, Wisconsin.

TWIN DISC

TWIN DISC

Fluid Couplings

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

Branches or Sales Engineering Offices: Cleveland • Dallas • Detroit • Los Angeles • Newark • New Orleans • Tulsa

Fluid drives solve power transmission problems

To solve power transmission problems that *cut work output* and *raise costly downtime* on material handling equipment — more and more manufacturers *and* users specify various types of fluid drives.

Today, there are several types of these drives available, including fluid couplings, and single-stage or three-stage torque converters.

The fluid coupling is most widely used on equipment not requiring torque multiplication, but needing the shock cushioning characteristics of *fluid*.

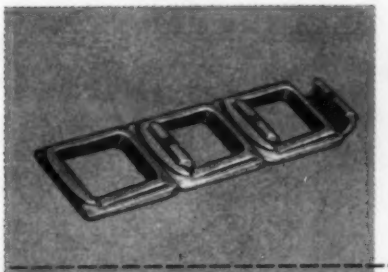
The single-stage torque converter is found most frequently where power driven equipment needs only *mild* torque multiplication. Possibly a simple fluid coupling has been used in the past, so installation of a single-stage torque converter can "modernize" machinery without a complete redesign.

The three-stage torque converter —with multiplication up to 6:1—is usually found when it is desired to maintain nearly governed engine speed—with maximum power output over a wide range—and to produce high torque ratios for hoisting or heavily loaded vehicles.

Whatever the equipment, whatever the application, the Twin Disc Clutch Company offers the only *complete* line of industrial fluid drives available for dependably transmitting power to driven equipment. Fluid couplings are provided in a variety of models for engines and motors from ¾ to 850 hp . . . and torque converters, both single-stage *and* three-stage, are available for engines from 30 to 1000 hp.

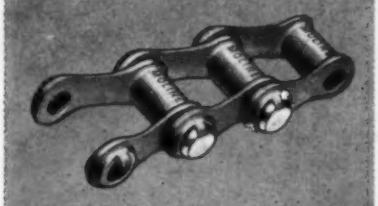
If *you* have a power transmission problem, and if you feel that a fluid drive will help solve it, *consult* Twin Disc Specialists for unbiased recommendations as to which drive is best suited to your particular operation.

FOR ALL TYPES OF CONVEYING ELEVATING AND HANDLING



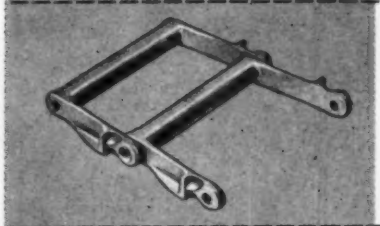
DETACHABLE CHAINS

for drives and elevators and conveyors, combine the advantages of easy assembly, utility and low cost.



PINTLE CHAINS

for drives and heavy duty conveyors and elevators, are light in weight and moderately priced.

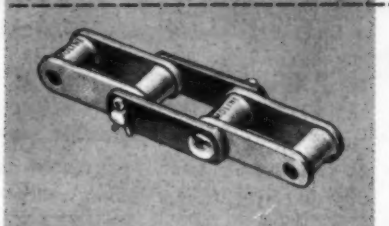


REFUSE CHAINS

for conveying wood refuse, ashes and other waste materials, are designed to push materials through troughs.

LONG PITCH PINTLE CHAINS

for conveyor and elevator service, provide great strength with minimum weight at low cost.



COMBINATION CHAINS

for extra heavy duty service, are used in conveying and elevating highly abrasive materials.

Moline Chains for conveyors, elevators and drives are the finest that modern manufacturing methods can devise. They have set the standards for many industrial purposes.

Moline Chains are available in both Moline Malleable or Moline Promal Iron.

Distributors and dealers everywhere. Write for information.

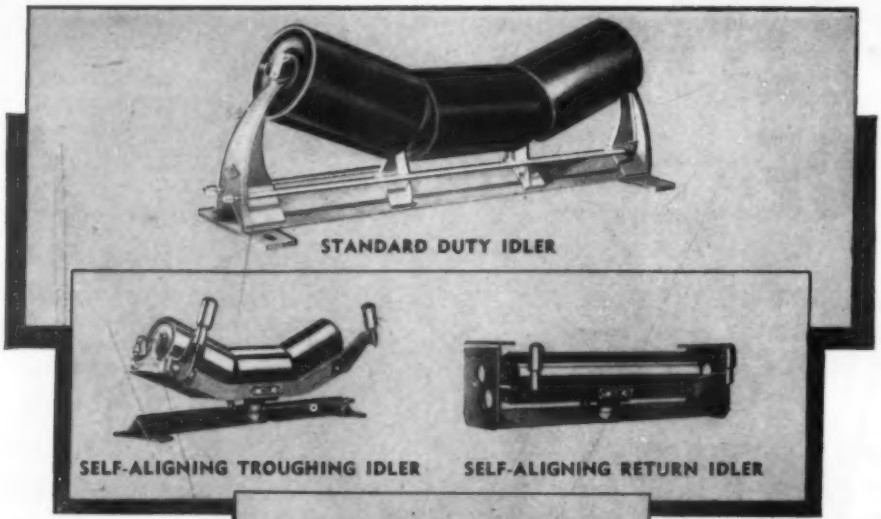
Moline CONVEYOR Chains

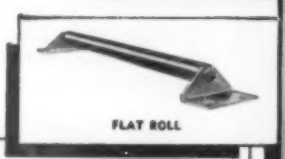
MOLINE MALLEABLE IRON CO.
ST. CHARLES, ILLINOIS

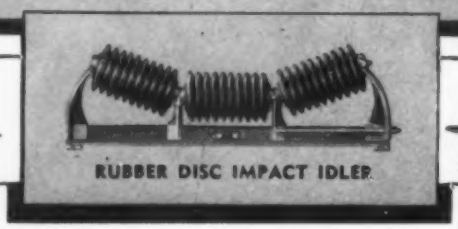
LEADERS FOR 60 YEARS

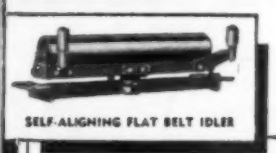
Licensed Manufacturers of Promal Chains

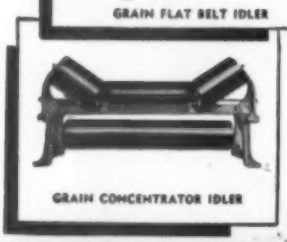
THERE'S A *Continental* IDLER for every purpose











Belt conveyors are used for handling many types of material. For this reason, Continental manufactures a variety of Idlers each designed to best take care of a particular application.

When ordering your next Belt Conveyor specify Continental Idlers and take advantage of our complete line.

Most standard size Idlers can be shipped FROM STOCK. Other sizes can be shipped promptly.

Specify CONTINENTAL

CD 4804

INDUSTRIAL DIVISION
CONTINENTAL GIN COMPANY
BIRMINGHAM, ALABAMA

ENGINEERS — CGC — ATLANTA • DALLAS • KNOXVILLE • MEMPHIS — CGC — MANUFACTURERS
NEW YORK 17, NEW YORK

The New York City Water Supply Co. uses these 2 yd. Lima Type 802's (above and at left below) to quarry rock near Neversink, N. Y. Lima quality really pays off in low downtime on tough digging jobs like this.

These LIMAS dig and load rock fast... and stay on the job day-in and day-out

It takes a really rugged machine to dig and load rock day-in and day-out. That's why thousands of users depend on Limas—like the Type 802, 2 yd. shovel shown here—to handle their toughest rock jobs. They know that Lima quality guarantees them the extra-rugged construction needed for high output, low downtime, money-making operation.

It will pay you to get the full story on the complete line of quality-built Limas. Find out today how you can get maximum performance and operating economy—with a Lima. See your nearby Lima distributor, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

COMPARE QUALITY! No other machine gives you as much as LIMA!

1. Piston-type dirt seal rings and retainers in crawler rollers.
2. Moving parts are flame or induction hardened for longer life.
3. Main machinery is placed well back of center of rotation.
4. Anti-friction bearings at all important bearing points.
5. Big capacity drums and sheaves are easy on cables.
6. Torque converter (optional).
7. Wherever you are, you can depend on skilled service and nearby warehouse stocks of parts to keep your LIMA on the job continuously.

COMPARE and you'll specify LIMA for shovels (½ yd. to 6 yds.), cranes (to 110 tons) and draglines (variable). Smaller capacities available on rubber.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

BALDWIN BLH LIMA-HAMILTON

LIMA SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

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A.R.B.A. ROAD SHOW and CONVENTION,

International Amphitheatre, Jan. 28 to Feb. 2, 1957

Here in Chicago everything is being done to make the coming A.R.B.A. Road Show and Convention an event that will be remembered for its value as an instructive conference, a helpful equipment show and its pleasures. Chicago's vast hotel setup is being organized to care for the large attendance that will be present. The International Amphitheatre is the largest exhibit hall in the Country and will provide an ideal spot for gathering and viewing the over 1,000 pieces of equipment that will be shown.

The Stock Yards Inn with its many eating places and cocktail lounges, and the cafeterias in the Amphitheatre, assure comfortable restaurant facilities.

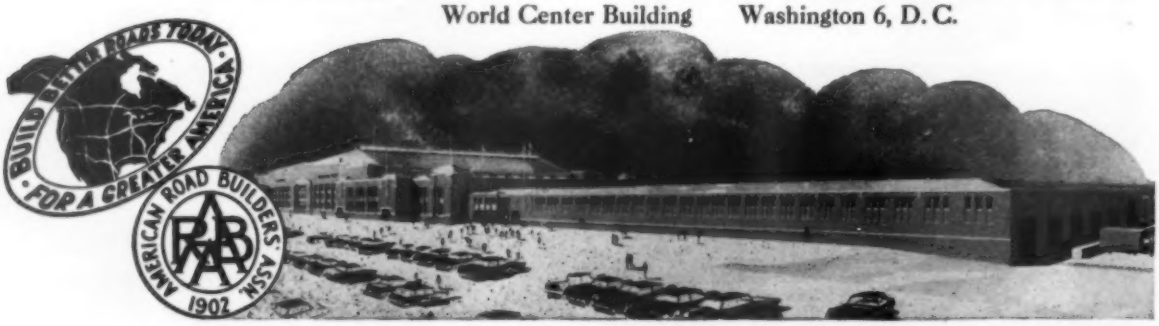
Free Bus Service from the main hotels will assure adequate transportation and permit attending convention sessions regularly and at the same time allow you to spend time at the show.

Add to all this the many attractions that Chicago always provides.

Remember the place—the date—and make your plans. Ask to be put on the list to receive future information on the 1957 Road Show and Convention.

AMERICAN ROAD BUILDERS' ASSOCIATION

World Center Building Washington 6, D. C.

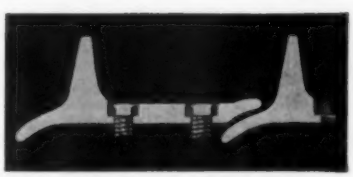


Switch to extra-tough AMSCO® MANGANESE STEEL TRACTOR SHOES

When the going is extra tough, as in rocky areas or abrasive mineral soils . . . tractor shoe replacement can become a major cost item. Both repair time and down time eat up profits.

Switch to "the toughest steel known" . . . Amsco Manganese Steel . . . for tracks and grouser bars. Check their much longer service life against the moderate extra cost. Add to this the greater efficiency and pulling power of your tractor, over a longer period of time. The answer: *important operating economies.*

Amsco Manganese Steel gives excellent resistance to abrasion accompanied by impact . . . actually *work-hardens* in use. Write for full information on long-wearing Amsco Manganese Steel Tractor Shoes—the economical answer to high track-replacement costs.



COUNTER-SUNK BOLT HOLES

Amsco Track Shoes have holes counter-sunk for less wear on bolts. Saves cost of replacing bolts when changing shoes.

AMERICAN Brake Shoe COMPANY

AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

OTHER PLANTS IN: DENVER, LOS ANGELES, NEW CASTLE, DEL., OAKLAND, CAL., ST. LOUIS; JOLIETTE, QUEBEC
Distributed in Canada by Canadian Liquid Air Co., Ltd.

When You Specify Southern Tire Retreading

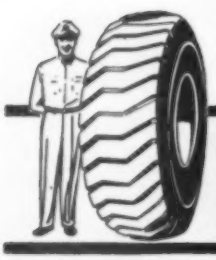
NO TIME LOST!

BIG MONEY SAVED!

NO TIME LOST . . .
Because Southern Tire representatives pick up and return your tires at your job site after work hours, assuring no costly equipment downtime.

BIG MONEY SAVED . . .
Because Southern Tire Retreads are guaranteed to equal new-tire mileage—at half the cost! Southern Tire's giant three-sectional molds (standard with U. S. Army) are fitted to the tire, instead of tire being cut down to fit mold. Finished retread has as much rubber in the lugs as a new tire and more undertread than any rock service tire.

CHOICE OF ROCK SERVICE, TRACTOR TYPES, OR RIB TREADS TO SUIT YOUR PARTICULAR JOB.



All Sizes from 1100x24 to 2700x33.
Also new sizes 29.5x25 and 29.5x29.
Call Your Favorite Dealer and Specify Southern Tire Retreads.

NEW ADDRESS
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Sheffield, Ala.
Phone Collect
Sheffield 4740

SOUTHERN TIRE COMPANY

BARGAINS FROM OUR OPERATIONS

HAMMERMILLS
Two—Pennsylvania, Thor-Ajax, SXR 100, 10" x 55" Opening, capacity 100 TPH #4 Mesh, Reversible Hammers, Excellent condition.

GYRATORY CRUSHERS
Two—Superior McCully 10", 30 TPH at 1¾" setting, 83 TPH at 3½" setting, both crushers are in very good condition.
One—Allis-Chalmers Gates 9K, 21" x 76" in excellent condition.

CRANES
Two—Link Belts, Model K-42, crawler travel, 1½ yd. capacity, 50 ft. booms, and powered by Cummins Diesel Engines, Working now.

ELECTRIC SHOVEL
MARION 490—2300 Volt 2½ yd. Bucket—Ward Leonard Controls. Can be inspected while in Quarry operation.

GAS SHOVEL
THEW-LORAIN—758, Waukesha Gas Engine, 50 ft. Boom, 1 Yd. Dipper. Here is a bargain in an old shovel in working condition for a job not warranting a big investment.

AIR COMPRESSORS
Stationary from 248 to 518 CFM at 100 lbs., all in working condition.

QUARRY CARS
150 Cars, 24" wheels, 56½" Standard Track Gauge, 10 ton capacity end dumps, spring suspension, inside box dimensions, 103" x 75" x 40", wt. 15,000 lbs. each, very good condition.

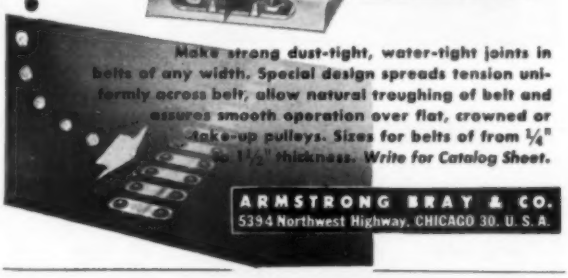
PIT CARS
500—Cars, 42" Track Gauge, 4.4 Tons capacity, End Dump—All in good condition.

CATERPILLAR EQUIPMENT
1—Traxcavator T-7, D-8800 Engine, 2½ yd. Bucket, D-7-N Towing Winch, Smooth Pads, Rebuilt Recently.
2—Tractors D-8 with D-13000 Engines and Blade.

Also Available Many Other Items Surplus to our Redi-Mix, Quarry and Coal Mining Operations — Write for Listing:

MATERIAL SERVICE CORPORATION
4626 SO. LAWNDALE AVENUE • LYONS, ILLINOIS
John E. Fitzgerald • *Phone: LYons 3-4969*

PLATEGRIP
PLATE FASTENERS FOR CONVEYOR BELTS



Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of from ¼" to 1½" thickness. *Write for Catalog Sheet.*

ARMSTRONG BRAY & CO.
5394 Northwest Highway, CHICAGO 30, U. S. A.

CONTRACT CORE DRILLING

EXPLORATION FOR MINERAL DEPOSITS
INCLUDING URANIUM & LIMESTONE — ANYWHERE

FOUNDATION TEST BORING

GROUT HOLE DRILLING

Skilled crews and complete stock of core drills and accessory equipment maintained at all times

Core Drill Contractors for more than 60 years

JOY MANUFACTURING CO.
Contract Core Drill Division
MICHIGAN CITY, INDIANA

Top Quality CEMENT PRODUCTION

Raymond WHIZZER SEPARATION

✓ **Check the Advantages:**

Closer Separation of the Fines

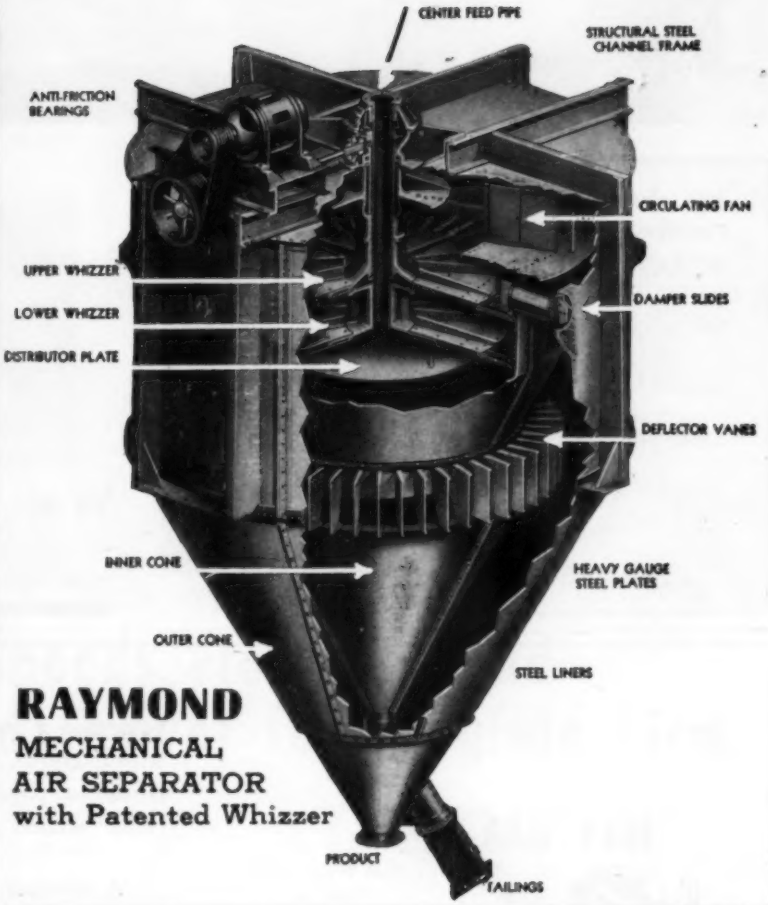
Cleaner Tailings

Easy Fineness Control by Outside Adjustment

Produces Any Grades from Standard Portland to High Early Strength

Increases Production by 25% to 100% in Closed Circuit Operations

For the "Inside Story" of Whizzer Separation and its superior results in classifying all types of powdered products, write for Raymond Bulletin No. 76.



RAYMOND
MECHANICAL AIR SEPARATOR with Patented Whizzer

For Classifying raw mix and cement clinker, as well as lime products and many other powdered materials, The Raymond Separator with its revolving Whizzer action does an outstanding job in making uniformly fine grades at record low costs.

This machine is ruggedly built for long, economical service and protected at critical wear points by hardened steel liners. Power and maintenance costs are exceptionally low.

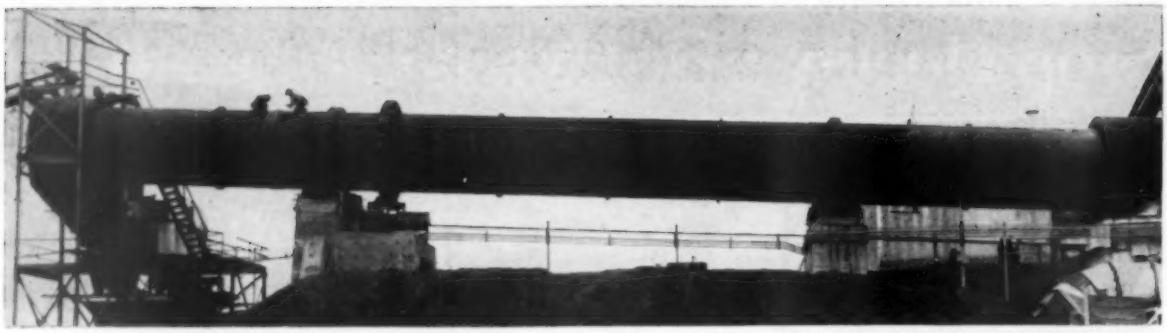
It is equally efficient for handling silicate materials, flint, feldspar and quartz (with special construction) as well as chemicals, pigments, gypsum, and lime hydrates. If you have a difficult separating problem, get the facts on Raymond Whizzer Separators.

COMBUSTION ENGINEERING, INC.
Raymond Division

1321 NORTH BRANCH ST.
CHICAGO 22, ILLINOIS

SALES OFFICES IN PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd., Montreal, Canada



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We design and manufacture

ROTARY KILNS

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DRYERS

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COOLERS

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LIME HYDRATORS

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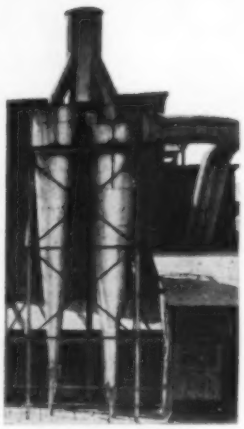
DUST COLLECTORS

and design the plants in connection with the same.



NEW HIGH EFFICIENCY DUST COLLECTOR

7'x60' CLAY DRYER INSTALLED IN HENDERSONVILLE, N. C.

W. P. HEINEKEN, INC.

ENGINEERS MANUFACTURERS

50 BROAD STREET • NEW YORK 4, N. Y.

Each month, PIT and QUARRY publishes, not one, but *two* classified sections—a big "Broadcast" section in the back-of-the-book and a smaller section in The Concrete Manufacturer. (In this issue, you'll find the Broadcast pages starting on page 319, the "CM" section on page 305.)

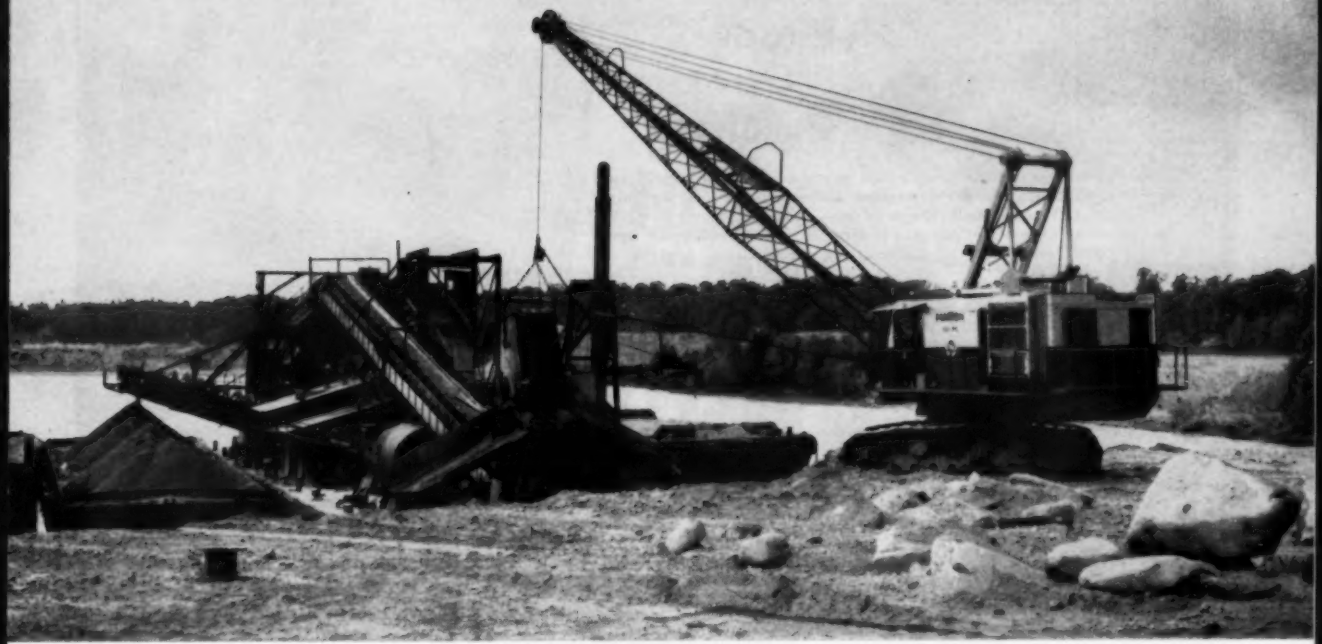
A number of our classified advertisers already have tried "hitting 'em with both barrels"—with gratifying (and profitable) results. If you have used equipment to sell—or are looking for something to buy—related to both the quarrying and concrete industries, why don't *you* take advantage of this double opportunity?

Rates are printed at the top of each section, or write today for attractive contract schedules.

PIT AND QUARRY PUBLICATIONS, INC.

431 S. Dearborn St. Chicago 5, Ill.

FEEDING FLOATING PLANT



Dragline Speeds Flow of Sand and Gravel for Virginia Firm

This Marion dragline equipped with 4½ yard bucket helps a Virginia firm produce a steady flow of sand and gravel to supply its many outlets in the Middle Atlantic area.

The 111-M teams up with a floating plant and barges to chew away on the company's vast reserves in an efficient operation.

The 111-M is ideally suited to this assignment. The 4½ yard bucket and fast cycle time keep the processing plant hopper full. Its 80-foot boom keeps the machine safely away from the bank edge. Diesel mobility plus electric swing on the 111-M mean the elimination of friction swing clutch heat problems.

In dragline service, booms are available to 100 feet, buckets to 5 cubic yards. With any front end combination, the 111-M is a real producer. The 111-M diesel with electric swing does many types of big jobs well, and offers significant operating advantages. Let your nearest Marion Distributor tell you more about this outstanding Marion and the jobs it is doing.

Whatever your job requirement, there is a Marion machine of the right size and type for greatest efficiency

MACHINE	SHOVEL CAP. IN CU. YDS.	HOE CAP. IN CU. YDS.	CRANE RATINGS			ASK FOR BULLETIN NO.
			CRAWLER MOUNT		TRUCK MOUNT MAX. USABLE	
			MAX.* STABILITY	MAX. USABLE		
MARION 35-M	¾	¾	18T @ 10′	18T @ 10′	25T @ 10′	431
MARION 43-M	1	1-1¼	27T @ 10′	20T @ 12′	35T @ 15′	430
MARION 362	1½	1½-2	43T @ 12′	30T @ 15′		398-D
MARION 87-M	Special Crane		150T @ 12′	75T @ 15′		—
MARION 93-M	2½	—	80T @ 12′	50T @ 15′		397-F
MARION 101-M	3	—	84T @ 12′	57T @ 15′		417-A
MARION 111-M	4	—	169T @ 12′	105T @ 15′		402-C

For Comparison Purposes Only

MARION POWER SHOVEL CO.
MARION, OHIO, U. S. A.

Please send me Bulletin 402 on the Marion 111-M.

Name ..... Title .....

Company .....

Address .....

City ..... State .....

← P.B.P.*

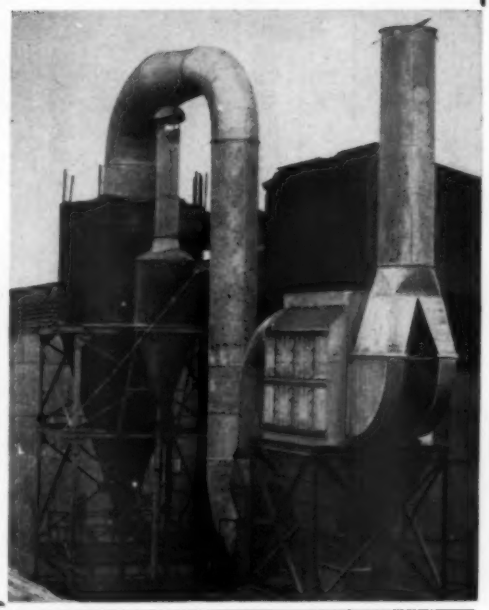
*PROOF . . . . . BEFORE PURCHASE

The photo above shows simple but accurate test equipment used by Dustex Corp. to pre-determine collection efficiency, hourly collection rate, and stack losses, if any, to be expected after installation of Dustex Collectors. Testing is performed under operating conditions, without interrupting production, and at no cost or obligation.

The photo at right shows a recently installed Dustex Collector, purchased after thorough testing as outlined above. The Dustex is installed secondary to a large cyclone, collecting natural cement fines resulting from a rotary kiln drying operation at the Louisville Cement Company of New York Plant, Akron, New York.

RESULT: End of serious dust nuisance *plus* saving of usable product.

Write today for a more detailed description of our pre-purchase test method.

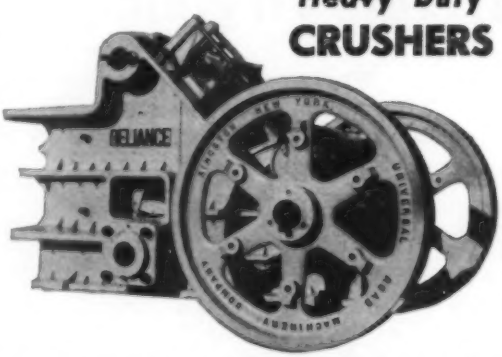


dustex CORP. P.O. BOX 2520 BUFFALO 25, N.Y.

TOPS FOR TOUGH JOBS

RELIANCE

Heavy Duty CRUSHERS



GREATER WEIGHT • MORE STABILITY

RELIANCE builds crushers with an extra measure of ruggedness to insure life-time service, plus record economy in operating and maintenance costs. With their long jaw plates, these units are adjustable to deliver a product of any desired fineness.

RELIANCE designs and builds crushing, screening and washing plants from 50 to 1500 tons per day capacity.

Write for Bulletin

UNIVERSAL ROAD MACHINERY CO.
KINGSTON • NEW YORK

AJAX Flexible couplings

Ajax Series D-100 Dihedral Couplings handle shaft misalignment, — offset, angular and end float up to 12°. Patented tooth design permits far less tooth clearance and provides more tooth area in contact under misalignment than with any other shaped tooth. No end-of-tooth wear, even under maximum misalignment.

D100-12°

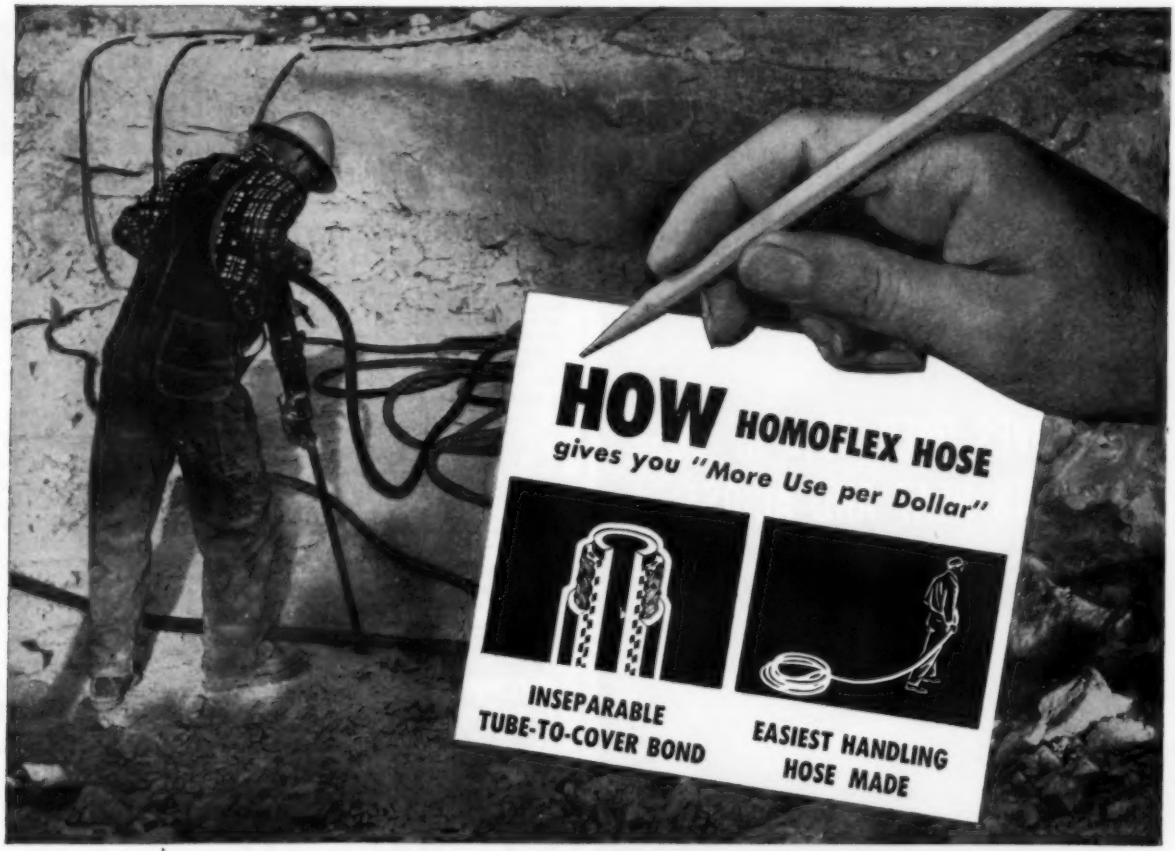
Ajax Series D-3000 Dihedral Couplings handle shaft misalignment up to 3°, — yet cost no more than ordinary gear type couplings that have far less misalignment capacity. Specially designed gear teeth distribute load over center of teeth, point of greatest strength. Johns-Manville "Clipper" Seals keep lubricant in and foreign matter out.

D3000-3°

Ajax Rubber-Bronze Bushed Couplings are built in a wide range of sizes and capacities with standard couplings made of forged steel or cast semi-steel. Flanges can be machined from aluminum, bronze and other metals, and can be chrome, cadmium or silver plated for protection from adverse atmospheric conditions. *Write for catalogs today.*

RUBBER-BRONZE BUSHED

AJAX FLEXIBLE COUPLING CO. INC.
WESTFIELD, NEW YORK



This Easiest Handling Hose Gets More Work Done–Cuts Labor Costs

Bulk and stiffness have been engineered *out* of this modern hose. The unique construction of Homoflex Hose makes it light, flexible as a rope, yet strong. Made with no pre-set twist, it coils and uncoils *without* kinking. Exclusive R/M engineering creates a homogeneous cover, strength member and tube that are virtually inseparable . . . This hose is easier to handle, yet strong and safe for the toughest jobs!

Homoflex Hose is easier to couple, too, because it has uniform inside and outside diameters. All these features mean that Homoflex Hose lasts longer, gets more work done, handling air, water, other fluids and gases. Ask the R/M representative to show you how Homoflex Hose and other types of R/M hose for general and special purpose use do a better job, longer . . . give you "More Use per Dollar."

RM-612

RM

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings
Asbestos Textiles • Packings • Engineered Plastic, and Sintered Metal Products • Laundry Pads and Covers • Bowling Balls

New collector in operation—over 90% of the dust in stack effluent eliminated.

Proved in use, Southern's new wet type dust collector eliminates 90% of atmospheric dust, while resisting heat and acids.

It all started when we set out to manufacture a light weight aggregate for the building industry. Because of excessive heat, corrosive and abrasive action, we faced a tough atmospheric pollution problem: over 50,000 c.f.m. of reddish brown stack effluent was escaping from six stacks. Many dust collectors—including a commercial wet type—were tried, but none lasted more than a few weeks; none could withstand the heat, acids, and corrosion present. Finally Southern experts solved the problem with an all-new wet type collector that removes approximately 50 tons of dust per day.

If your plant faces a difficult atmospheric pollution problem, it will pay you to get the facts on this new collector. Just contact us. We'll be happy to send a representative, or mail the information desired. No obligation, of course.

SOUTHERN LIGHTWEIGHT AGGREGATE CORPORATION

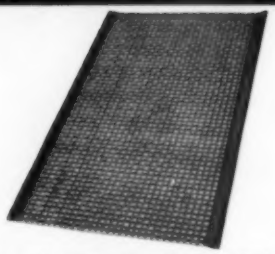
PROCESS ENGINEERING DIVISION, BOX 9138 RICHMOND, VA.

HANCO SCREEN HEATERS

ELIMINATE *Costly* SCREEN BLINDNESS

PUT ON THE HEAT FOR GREATER TONNAGE

- **EASILY ADAPTED** quick change assemblies assure fast screen changes, save valuable man hours.
- **LOW MAINTENANCE COST** designed for heavy-duty service, requires only occasional routine inspection, copper distribution bars are guarded against abrasion.
- **FASTER SCREENING** by eliminating "blinding" and "clogging" full use of processing equipment is made possible.
- **LONGER SCREEN LIFE** elimination of manual cleaning process increases screen life up to 900% and saves screen wear.
- **LESS SHUT-DOWN TIME** for replacement of worn screens.



GET THE FACTS ON HANCO HEATERS— EASILY ADAPTED TO YOUR OWN INSTALLATION

(See Our New Descriptive Folder No. 756)

HANCO Electric Screen Heaters convert any volt or cycle current from plant power lines into low-cost, low-voltage current, delivered through high amperage cables and copper distribution bars to the screen cloth. Heat generated in the screen wires makes "clogging" and "blinding" impossible.

Hanco

F. R. HANNON & SONS

1605 Waynesburg Rd. S.E., Canton 7, Ohio

PIONEERS IN ELECTRIC SCREEN HEATING — FIRST IN THE FIELD OF LOW VOLTAGE AND HIGH AMPERAGE SCREEN HEATING

HETHERINGTON & BERNER

DREDGING PUMPS

performance-proven on the toughest jobs

H&B ESTABLISHED 1907

Hetherington & Berner sand and gravel pumps are available in two general types: *STANDARD*, (4″, 6″ and 8″ sizes) with semi-steel parts, for ordinary working conditions and moderate heads; and *DREADNAUGHT*, (6″, 8″, 10″, 12″ and 15″ sizes) with manganese steel parts, for heavy duty jobs with stringent head conditions.

Write for Bulletin DP-147.

HETHERINGTON & BERNER INC.

753 Kentucky Ave. Indianapolis 7, Indiana

faster

Royal Blue has won acceptance *faster* than any other wire rope in Roebling history

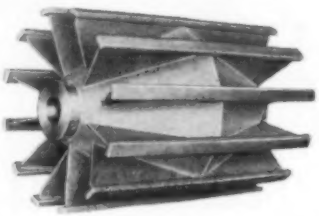
John A. Roebling's Sons Corporation, Trenton 2, N. J., Subsidiary of The Colorado Fuel and Iron Corporation BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 2340 GLENDALE-MILFORD RD., EVENDALE • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • PITTSBURGH, 1723 HENRY W. OLIVER BLDG. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6.

FOR GREATER MATERIAL HANDLING EFFICIENCY...

GREATER PROFIT

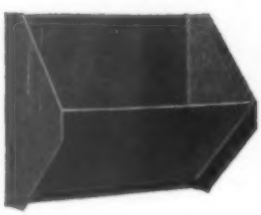
STANDARD WING TYPE SELF-CLEANING PULLEY

- SELF CLEANING
- STRONG REINFORCED WELDED CONSTRUCTION
- LOW COST



So strong it can withstand the most punishing loads without flinching . . . because its all-steel welded construction gives it far greater strength with less weight at lower cost.

CONTINUOUS ELEVATOR BUCKET STYLE #2



Built to take the hardest use you can give it and come back for more, this bucket is typical of the complete line of low cost, rugged Standard Steel Buckets — available in Salem, Style "A," shelf type and other continuous style buckets.

STANDARD BIN GATE

Speed material handling with this Standard gear-operated bin gate, which has all-steel welded construction. Other styles in Standard Bin Gates also available.

Slash material handling costs by converting to Standard. Write today for catalog showing the complete Standard line.

STANDARD METAL MFG. CO.
111 CENTER ST. MALINTA, OHIO

CUT TIME AND LABOR COSTS

on "secondary breakage"

with FREDERICK CAST semi-steel DROP BALLS

Eliminate costly, time-consuming drilling or blasting with this low-cost production tool. Rugged, durable Frederick Drop Balls provide you with quick, easy crushing power where you want it—when you want it, with little or no maintenance. Frederick's exclusive "pear-shaped" design withstands greater impact and gives straighter "pin-point" drops. Exclusive "E-Z Swing" steel eye is recessed to prevent excessive ball movement and keep hook in place. Nickel alloy is standard on balls 4000 lbs. or over—or, we'll be glad to quote on special alloys if desired.

Balls can be furnished with replaceable pins, if requested. Special release hooks for free dropping are also available.

Write today for prices and illustrated literature; send order direct or telephone.

	Wide Range of Sizes and Weights:						
Pear shape (lbs.).....	1500	2000	3300	4000	5200	6500	8000
Ball shape (lbs.).....	500	1000	2000	5200			
Spherical shape (lbs.)..... (for magnet use)	470	950	1650	2400	3000	3700	5400

FREDERICK IRON & STEEL, INC.
FREDERICK *Established 1890* MARYLAND
Phone: MOnument 3-5111

CENTRIFUGAL PUMPS • MUNICIPAL AND GRAY IRON CASTINGS

USE #18 ALUMINUM WIRE FOR BLASTING . . SAVE 32% and More

- Equal to #20 Copper Connecting Wire in electrical efficiency
- 32% Savings compared to #20 Copper Connecting Wire
- 37% Lower shipping costs
- Easier handling — less weight

CHECK THESE LOW PRICES

#18 PLASTIC INSULATED ALUMINUM WIRE

METAL SPOOLS OF 250 FT. (EQUAL TO ONE LB. OF #20 COPPER CONNECTING WIRE)				
In lots of	50 to 99 Spools (Min. order)	100 to 499 Spools	500 to 999 Spools	1000 and over
Price	.85 ea.	.81 ea.	.77 ea.	.73 ea.

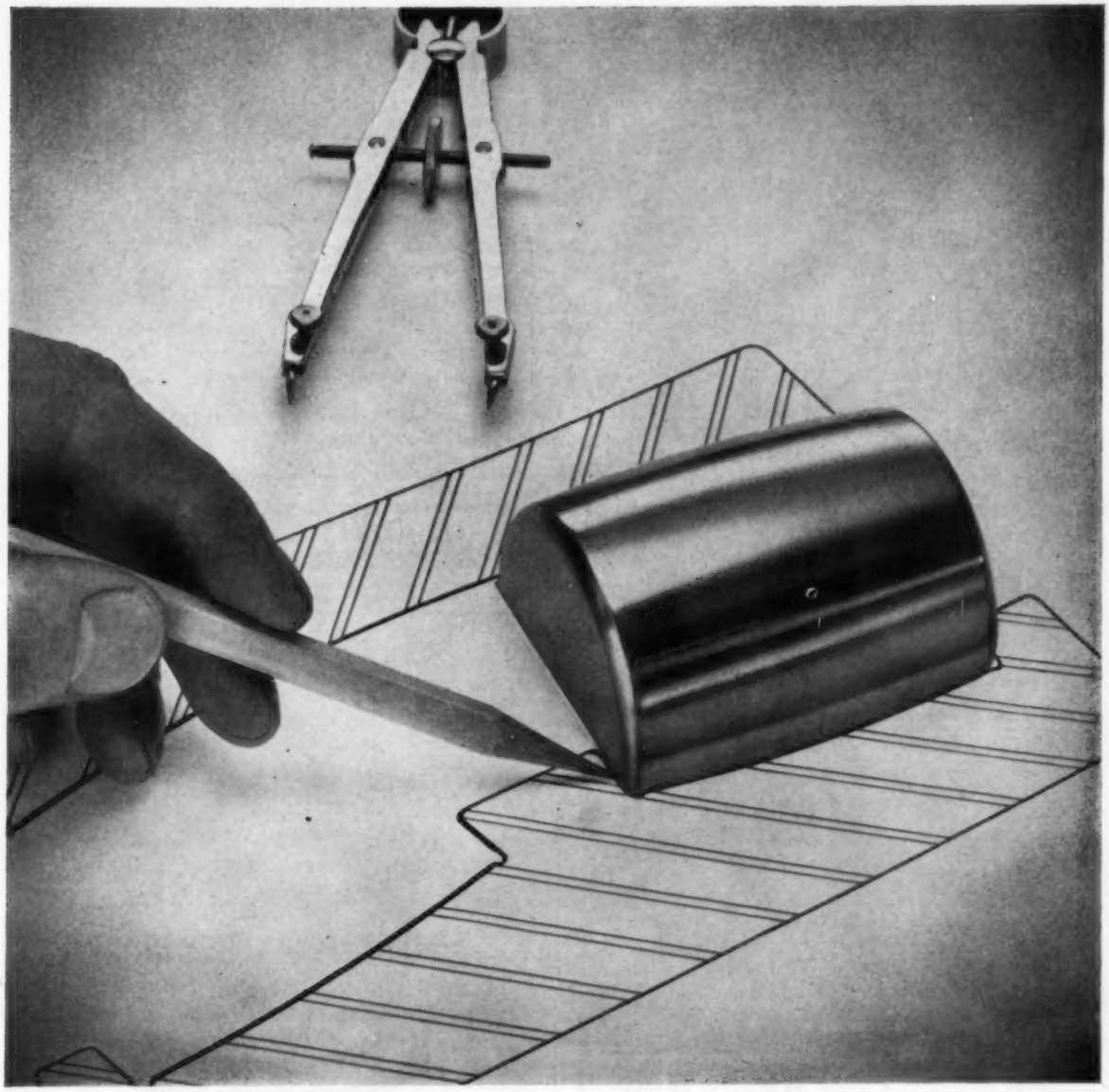
METAL SPOOLS OF 1000 FT. (EQUAL TO 4 LBS. OF #20 COPPER CONNECTING WIRE)				
In lots of	10 to 29 Spools (Min. order)	30 to 99 Spools	100 to 249 Spools	250 and over
Price	$3.20 ea.	$3.04 ea.	$2.89 ea.	$2.72 ea.

All prices FOB Chicago—Sh. wgt. apr. 2½ lbs. per 1000 ft.

WRITE FOR SAMPLE

Coleman Cable & Wire Co.
3919 Wesley Terrace
Schiller Park, Illinois

TORRINGTON *SPHERICAL ROLLER* BEARINGS



What a difference *conformity* makes!

TORRINGTON SPHERICAL ROLLER BEARINGS have the right degree of conformity between rollers and races and between roller ends and the center guide flange. "Skewing" is eliminated and rollers operate with a minimum of friction. This means even load distribution and long, low-maintenance service.

Because of their excellent performance in heavy-duty application, Torrington Spherical Roller Bearings have won wide acceptance in rock crushers, cranes, paper machinery, drilling rigs, presses—wherever high load capacity is required under conditions of misalignment.

Torrington Spherical Roller Bearings are available with either straight or tapered bore, for shaft or adapter mounting. And Torrington engineers have wide experience in custom-building bearings for special applications. Whenever you need bearings, call on TORRINGTON.

THE TORRINGTON COMPANY
South Bend 21, Ind. • Torrington, Conn.
District offices and distributors in principal cities of United States and Canada

90th ANNIVERSARY 1866-1956

TORRINGTON BEARINGS

Spherical Roller • Tapered Roller • Cylindrical Roller Needle • Ball • Needle Rollers

"Our hammer mill proved it—

Only Colmonoy No. 1 hard-facing lasts so long, costs so little!"

Colmonoy No. 1 hard-facing stands up under rough conditions involving impact and abrasion. Its cost is moderate and it welds easily. Great on equipment like dozer blades, shovel teeth, crusher rolls, and conveyor parts.

The new low-hydrogen coating provides excellent arc stability and makes weld cleaning between successive passes unnecessary. You can use it on vertical surfaces, too. Colmonoy No. 1 deposits are hard: 58 to 63 Rockwell C.

Write today for more information about Colmonoy No. 1 and the rest of the Colmonoy line of hard-facing alloys.

HARD-FACING ALLOYS

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CORPORATION

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Available as 1/8, 3/16, and 1/4-inch diameter electrodes (DC), in 10 and 50 lb. metal containers.

Buy Valuable long life and economy that you can actually

SEE...

Reg. U.S. Pat. Off.
Kleenslot **WEDGE WIRE PREPARATION SCREENS**

MARCEL TYPE SCREEN: This screen, as all WEDGE WIRE products, gives long life and non-blinding operation, maximum dewatering efficiency is combined with a wavy type of screen preventing objectionable slivers passing through. This keeps the end product uniform.

WEDGE WIRE ALUMINUM SCREENS: They have all the attractive and sturdy features of many other metals besides aluminum and offer a flexing action that adds capacity and dewatering abilities which are almost unbelievable. It gives a distinct advantage where vibration is prevalent.

Wedge-Wire CORPORATION
GAS STREET AT NICKLE PLATE R. R., WELLINGTON, OHIO

CONVEYCO
NEW DEPARTURE BALL BEARING TROUGHING IDLERS

CONVEYCO
TIMKEN ROLLER BEARING TROUGHING IDLERS

Patent No. 2,687,799

THERE'S A SECRET TO LONGER IDLER LIFE!

It's U.S. Patent No. 2,687,799

Whatever your job conditions may be, Conveyco Idlers with sealed-for-life New Departure Bearings or Conveyco Timken Bearing Idlers will give you better performance over a longer period. The secret is in the patented construction . . . let a Conveyco engineer show you how to reduce idler maintenance.

Note: Conveyco is a convenient source for repair or replacement parts on conveying equipment. Bearings, pulleys, etc.

Call LUdlow 2-8411 or write for Catalog 68 Today!

CONVEYCO **THE CONVEYOR CO.**
3260 E. Slauson Ave., Los Angeles 58, Calif.

RUGGED BUTYL INSULATION plus neoprene jacketing gives this ANACONDA Mine Power Cable long life under rugged conditions: 60-ft. drop over rocky cliff, unprotected from sun or weather in northern open-pit mine.

BUTYL INSULATION MEANS LONGER LIFE

This Cable is as tough as the terrain looks!

Experience shows that in high-voltage mine power cable, the insulation must provide not only good ozone resistance but *mechanical strength* as well.

The unusual tensile strength and inherent ozone resistance of Anaconda's butyl insulation means the strongest, sturdiest mine power cable ever offered you.

In addition, this insulation resists heat, moisture and has high dielectric strength. Over the insulation is a tough, abrasion-resistant neoprene jacket—engineered from years of testing in our own mines.

NEW ENGINEERING BULLETIN EB-27 has full details on performance of Anaconda butyl insulation in 15 Industry Specification tests. Ask the Man from Anaconda for your copy as well as more information about ANACONDA Mine Power Cable. Or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

58232

SEE YOUR ANACONDA®

DISTRIBUTOR FOR MINE POWER CABLE

MURPHY DIESEL POWER all the way means...

LOTS OF ROCK FOR LITTLE ROCK!

• It's Murphy Diesel Power throughout for producing aggregate with this equipment owned and operated by Reynolds and Williams, Little Rock, Arkansas. The crushing plant consists of a Pioneer 153 PRL primary, an SP-101 intermediate crushing and screening plant, and a 154 VE secondary roll crusher. At right angles to the secondary unit a 30-foot discharge belt leads to a separate bin. The crushing and screening units utilize Murphy Diesel Models 11, 20, and 22, while power for ten motors on conveyor and feeder belts is supplied by a Model 122, 135 K.W. generator set. The Murphy-powered Northwest Shovel shown at the quarry face is one of several owned by this producer. Photos were taken in the Reynolds and Williams quarry near Alpine, Arkansas.

Whatever the size of your plant, you want maximum output at minimum cost. It's yours with Murphy's greater fuel economy, longer trouble-free life and dependability unmatched by any engine of comparable size.

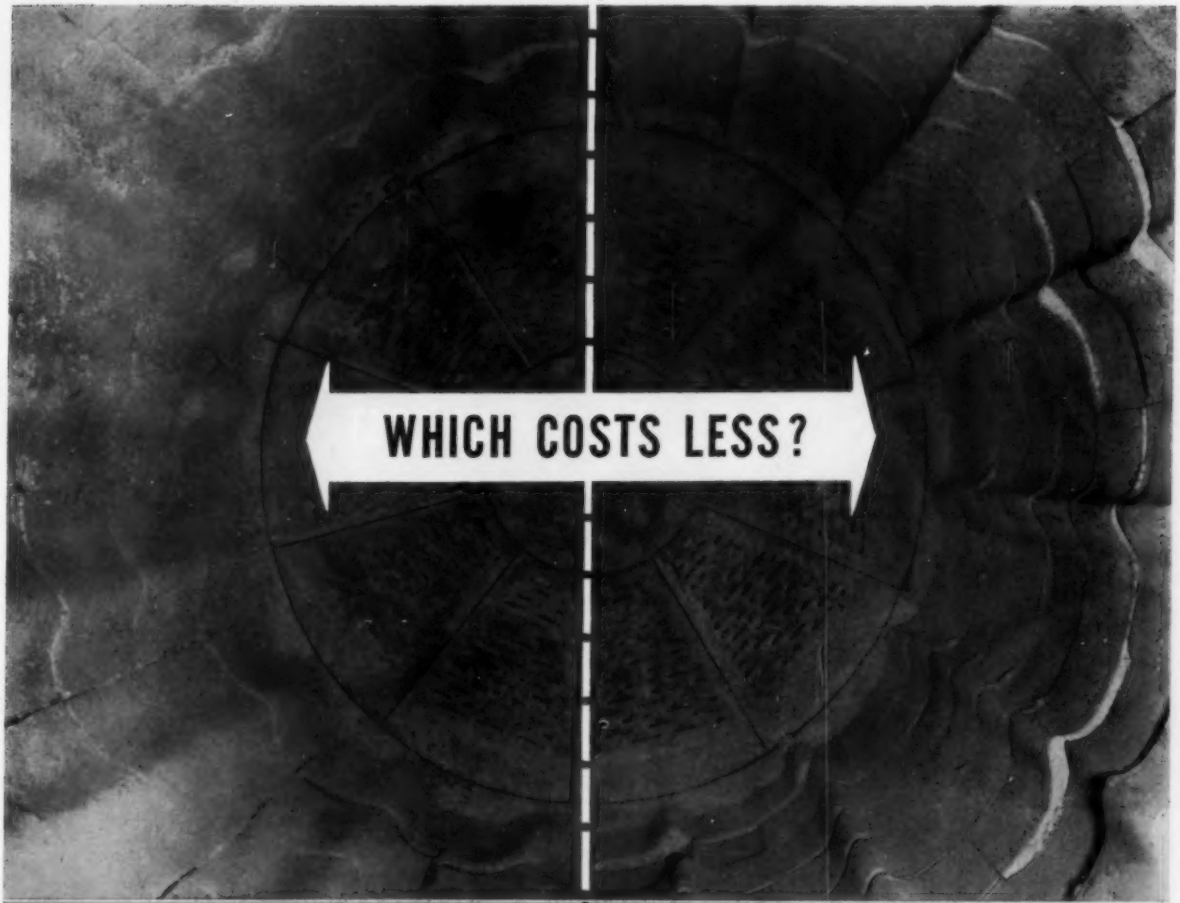
Check with Murphy Diesel owners in your area—we number them among our best salesmen. Let them tell you how Murphy has improved their profit picture. Then get together with your Murphy Diesel Dealer before you decide on an engine.

MURPHY DIESEL

352RO

Heavy-Duty Power
for Rock Crushing
Murphy Diesel Engines and Power Units are available in sizes from 96 to 264 H.P. Engine speeds are 1200 and 1400 rpm. "Packaged" generating units from 64 to 165 K.W.

MURPHY DIESEL COMPANY
5307 W. Burnham St. • Milwaukee 14, Wisconsin
Sales, parts and service throughout the nation



Low cost-per-pound steel liners?

Here's what happened when ordinary steel liners were operated in the same mill with ABK Metal liners. You can easily see the difference in wear in this photograph.

Low cost-per-ton* ABK Metal liners?

*Low cost per ton of material ground, of course. The slight additional first cost of ABK Metal is more than offset by its extra life, by reduced labor, by savings in equipment down-time.

ABK® METAL cuts cost 3 ways

1. ***Lasts longer*** . . . costs less per ton of material processed.
2. ***Slashes labor expense*** . . . of frequent liner replacement.
3. ***Prevents down-time*** . . . avoids costly losses in production.

Yes, three to four times normal life can be expected when ABK Metal replaces ordinary liners. That's because of its extreme hardness (500 to 700 Brinell) and very high resistance to abrasion. A controlled structure nickel-chrome iron, ABK Metal is produced *only* by American Brake Shoe.

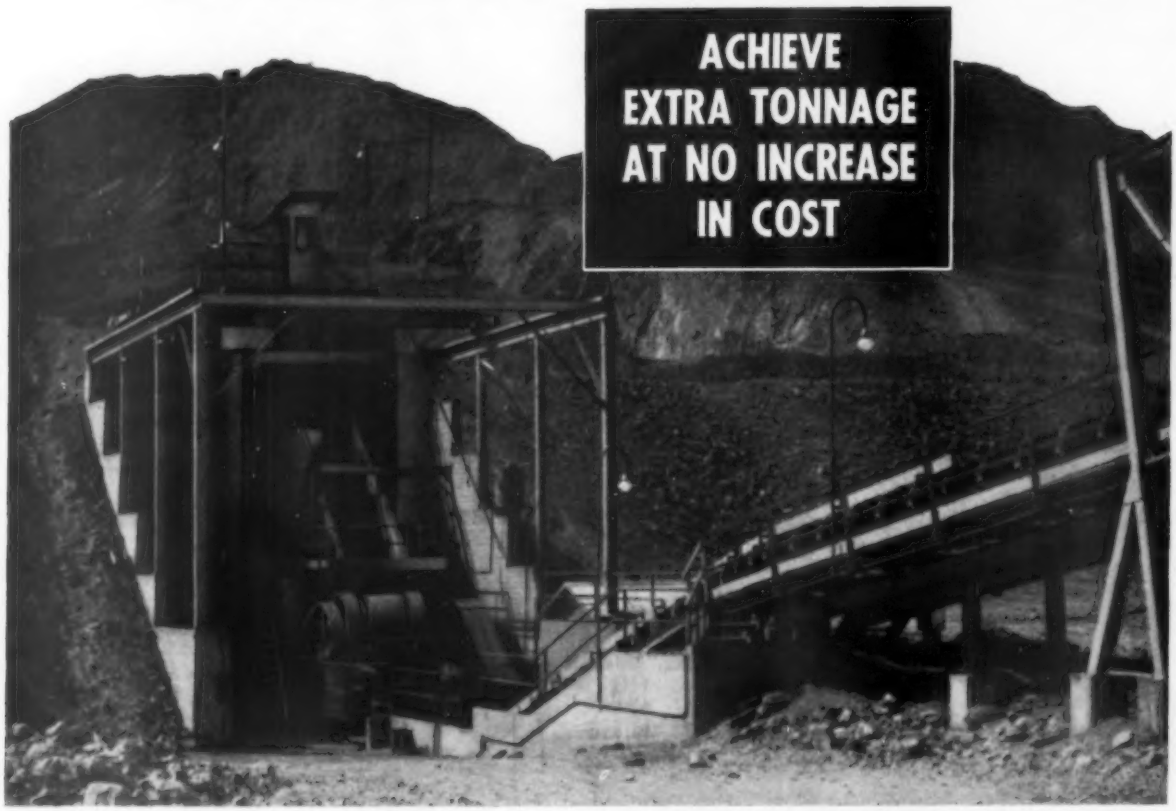
AMERICAN Brake Shoe COMPANY

A-973

BRAKE SHOE & CASTINGS DIVISION
230 PARK AVENUE • NEW YORK 17, N. Y.

Get a Better Break on Stone Reduction with

TRAYLOR JAW CRUSHERS



TRAYLOR Jaw Crushers are Traylor-Made to give you the break you need for cutting production costs on primary rock crushing. Traylor Curved Jaw Plates reduce choking and packing to achieve greater hourly tonnages of more uniform product . . . *at no increase in power requirements.* Less churning and slippage of the material being crushed also reduces unnecessary wear; as a result Traylor Curved Jaw Plates often outlast ordinary straight plates by as much as 3 to 1.

The massive construction of Traylor Jaw Crushers stands up to the heaviest round-the-clock production schedules with less down-time and lower maintenance costs. Available in 5 types and 33 sizes with feed openings from 8″ x 12″ to 60″ x 84″, Traylor Jaw Crushers provide you with the capacity for crushing from 4 to 1,000 tons of rock per hour.

Write today for your copy of bulletin 11-120 which describes and illustrates many cost cutting features of Traylor Jaw Crushers.

Traylor

TRAYLOR ENGINEERING & MFG. CO.
810 MILL ST., ALLENTOWN, PA.
SALES OFFICES: New York · Chicago · San Francisco
CANADIAN MFRS: Canadian Vickers, Ltd., Montreal, P.Q.

PRIMARY GYRATORY CRUSHERS

ROTARY KILNS

SECONDARY GYRATORY CRUSHERS

BALL MILLS

JAW CRUSHERS

APRON FEEDERS

For producers of Concrete Building Units, Pipe and Ready-Mixed Concrete

SEPTEMBER 1956

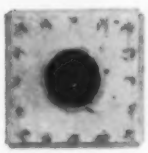
THE CONCRETE MANUFACTURER

A SPECIAL SECTION OF PIT AND QUARRY

30,000 Cu. Yd. of Ready-Mixed Concrete Were Used in This Ford Building, Dearborn, Mich.

Prestressed Hollow-Core 'Incor' Piles

Speed Wharf Construction at Esso Standard Deep Water Oil Terminal



● Interesting feature of this wharf, recently completed at Esso Standard Oil Company's Deep Water Oil Terminal, Newport News, Va., is the use of precast prestressed hollow-core concrete piles in the tanker dock with its six reinforced concrete mooring and breasting dolphins.

Piles average 77 ft. in length, with 18 x 18 in. cross section and 8 in. hollow core. A total of 151 prestressed piles were precast and pretensioned at job site, three piles at a time in each of seven 250 x 30 ft. pretensioning benches, using 'Incor'* 24-Hour Cement in the mix for faster re-use of the casting beds.

In the pretensioning bench, 'Incor' substantially reduces production time, and therefore cost, by providing dependable high early strength in 24-48 hours, making possible faster turnover.

In service, 'Incor' high-early and high-ultimate strengths assure quality concrete which is specially important in realizing the fullest advantage from prestressing.

*Reg. U. S. Pat. Off.

Above, left, new wharf is supported on 151 prestressed 'Incor' concrete piles, average length 77 ft. Piles were prestressed at job site; right, placing 'Incor' concrete in forms.

ESSO STANDARD OIL COMPANY—
DEEP WATER OIL TERMINAL
Newport News, Va.

Designed by
CARIBBEAN CONSTRUCTION CO., LTD.
Kingston, Jamaica, B.W.I.

Engineers and General Contractor:
TIDEWATER CONSTRUCTION CORPORATION
Norfolk, Va.

Ready-mix 'Incor' Concrete
BENSON-PHILLIPS COMPANY, INC.
Newport News, Va.

LONE STAR CEMENTS COVER
THE ENTIRE CONSTRUCTION FIELD

LONE STAR CEMENT CORPORATION

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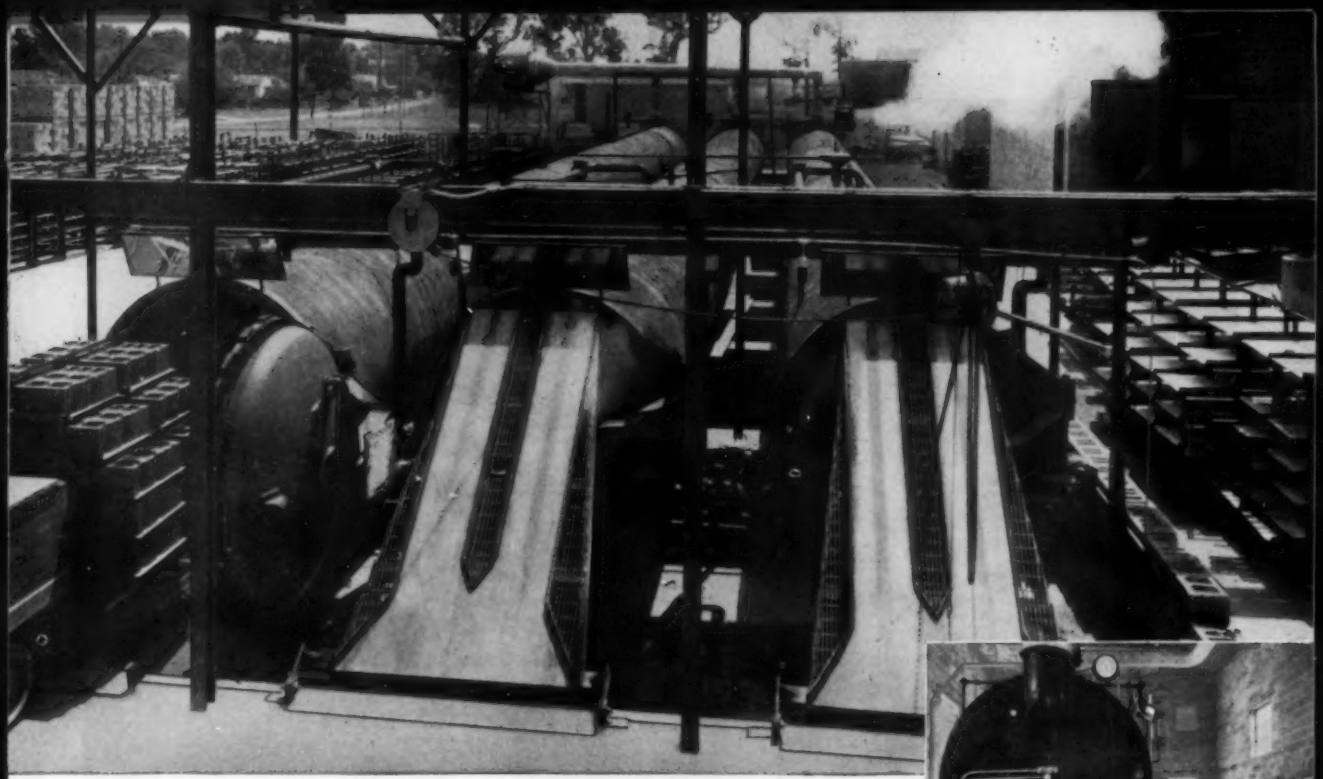
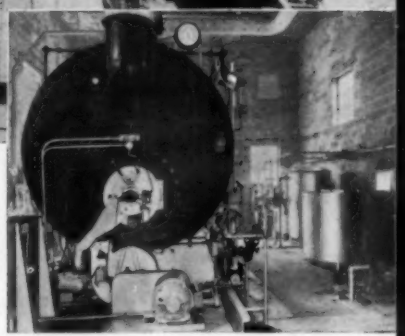
LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS: 18 MODERN MILLS, 38,000,000 BARRELS ANNUAL CAPACITY



More than 18 months of research and development by Southern Block and Pipe Corp., preceded the development of the modern process.

New "high-pressure" block plant sets new record with Cleaver-Brooks 600-hp boiler



New 600-hp boiler "speaks with authority," providing entire steam supply for this progressive firm. Starting service and operator instruction are furnished without extra charge — an important *extra* bonus for specifying Cleaver-Brooks boilers.

Automatically steam-cures 20,000 blocks and 150 tons of pipe and shapes per day

SOUTHERN Block and Pipe Corp., Norfolk, is to be congratulated on its impressive, record-setting achievement. This newest and most modern block plant in Virginia is a perfect pin-point example of the very latest in applied concrete products technology . . . *and why it pays to buy steam power with a punch!*

Consider what it takes to do all this:

- Steam-cure *five* high-pressure autoclaves of 8 x 8 x 16 in. block per 16 hours — or a total of 12,000 blocks.
- Steam-cure from *four to six* low-pressure (50 psi) kilns of block — each kiln containing 1400 blocks.
- Furnish steam for *six* additional kilns to cure 150 tons of concrete pipes and shapes.

Southern Block's new Cleaver-Brooks 600-hp boiler burns No. 6 fuel oil at an average rate of 1250 to 1500 gals. per 16-hr. day. Boiler operates continuously for 16 hours — at 140 psi at a maximum stack temperature of 400°F.

An outstanding maintenance job is being done by the steam engineer in charge. Daily checks are made on feedwater, oil consumption, water evaporation, and condition of all equipment in the cycle. Records prove that due to efficient operation and care, this plant is maintaining an average fuel-to-steam efficiency of *80% or better.* One more convincing demonstration of the day-in, day-out reliability and economy of Cleaver-Brooks' modern four-pass, forced draft boiler design.

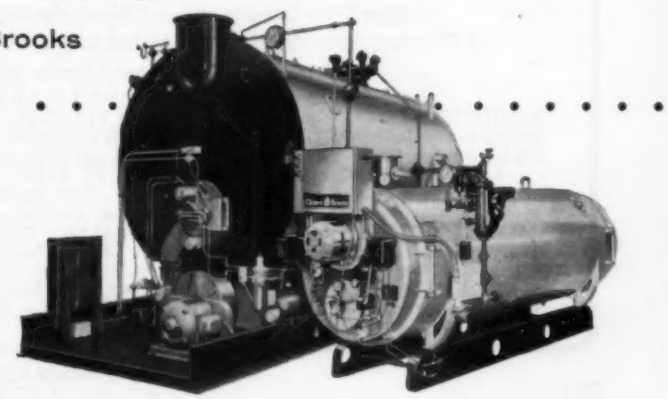
Steam needs... large or small... Cleaver-Brooks has the answer to them all

Cleaver-Brooks offers you a choice of 18 sizes, 110 models for oil/gas or combination oil/gas firing — in the range of 15 to 600 hp. Competent sales agents in principal cities assist you without obligation. For complete data, write:

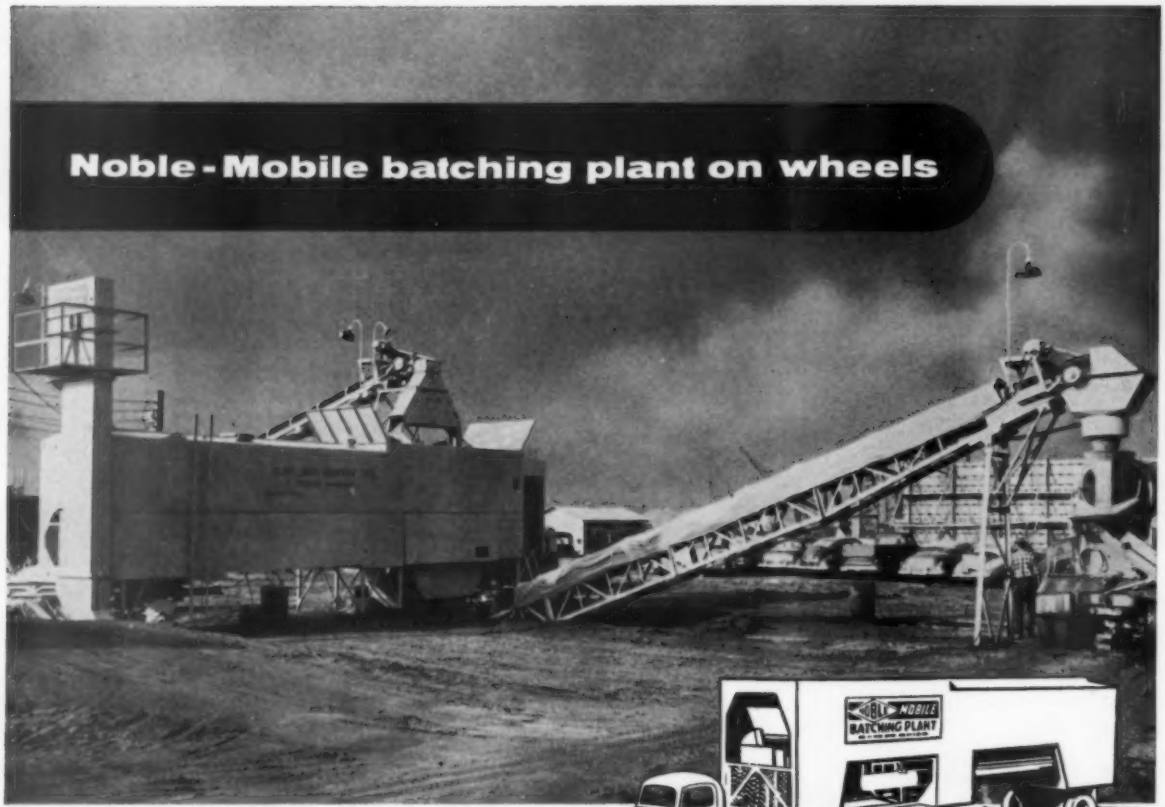
CLEAVER-BROOKS COMPANY
Dept. K, 347 E. Keefe Ave., Milwaukee 12, Wisconsin, U.S.A.
Cable address: CLEBRO — Milwaukee — all codes.

Cleaver-Brooks (25th YEAR)

TWENTY-FIVE YEARS OF LEADERSHIP BY THE ORIGINATORS OF THE SELF-CONTAINED BOILER



Noble-Mobile batching plant on wheels



gets job 21 miles from base and makes it pay...batches at job site with Noble-Mobile

Noble-Mobile at site of new Crown-Zellerbach plant, Antioch, Calif. 10" wheels dismounted for use on truck mixers. Supplier: H.W. "Heine" Gentry Co., Walnut Creek, Calif.

Hauled along highway like semi-trailer • Set up in one day—no field wiring, concrete footings or crane time required on base plant • Aggregates charged with front end loader, crane or conveyor • Bulk cement utilized ...batched automatically • Excellent quality control Maximum production from mixer trucks—short hauls, more yards per day • Production capacity 60 to 100 yards per hour • Covered by patents pending

NOBLE BATCHING PLANTS

Portable, semi-portable or stationary plants designed and built by Noble Company · 1860 - 7th St., Oakland 20, Calif. TEmplebar 2-5785

Other Noble Company offices: 20950 Center Ridge Road, Cleveland 16, Ohio. EDison 1-3426.
518 First Ave. North, Seattle, Wash. MUtual 4878 · 117½ W. Manchester, Inglewood, Calif. ORegon 8-4457.
International Sales Agent: Frazar International Corp., San Francisco

DISTRIBUTORS

BIRMINGHAM, ALA., Equipment Service Co. • PHOENIX, ARIZ., Superior Equipment Co. • VANCOUVER, B. C., Westcoast Equipment Co., Ltd. • DENVER, COLO., Western Machinery Co. • BALTIMORE, MD., General Supply & Equipment Co., Inc. • CEDAR RAPIDS, IOWA, James W. Bell Co. • INDIANAPOLIS, IND., Manwaring Machinery Co. • DETROIT, MICH., R. G. Moeller Co. • ST. PAUL, MINN., Borchert-Ingersoll, Inc. • CLEVELAND, OHIO, Wepco Equipment Co. • LOS ANGELES, CALIF., Smith-Booth-Usher Co. • PORTLAND, ORE., Loggers & Contractors Machinery Co. • PHILADELPHIA, PA., Furnival Machinery Co. • PITTSBURGH, PA., Equipment & Supplies, Inc. AMARILLO, TEXAS, Plains Machinery Co. • DALLAS, TEXAS, North Texas Equipment & Supply Co. • HOUSTON, TEXAS, Boehck Engineering Co. • EL PASO, TEXAS, Border Machinery Co. • WACO, TEXAS, Richards Equipment Co. • SAN ANTONIO, TEXAS, Contractors Machinery Co. • SALT LAKE CITY, UTAH, Arnold Machinery Co. SEATTLE, WASH., Star Machinery Co. • SPOKANE, WASH., Intermountain Equipment Co. • CASPAR, WYOMING, Studer Tractor & Equipment Co. • MONTREAL, QUE., Laurentide Equipment Co., Ltd. • WINNIPEG, MAN., Huggard Equipment Co., Ltd.

The CONCRETE MANUFACTURER

September 1956

What Does Your Community Think of You?

WHILE the questionnaire on public relations problems, recently sent to all members of the National Ready Mixed Concrete Association by its very efficient secretary, directly concerns such producers, it also highlights a common problem confronting all related industries using cement in producing construction materials. Its seriousness is reflected daily in accounts in every newspaper of the land, telling of cases where "good neighbor" relationships with communities are being imperiled by growing zoning problems. The status of your own plant might well be a subject in tomorrow's news items.

As Mr. Ahearn emphasized, these problems "not only threaten the operation of existing plants, but carry the threat of making the development of new plants a difficult and expensive proposition." His survey is indeed well designed to develop the extent and nature of the local pressure unfavorable toward this type of operation, so that factual advice can be perfected which will be of value to operators facing these problems in the future. If those answering do "a thoughtful and painstaking job" on the questionnaire, as requested, and tell what each is doing to cultivate good relations in his community, the group opinion should prove helpful to all.

In April of last year, we editorially advised: "Be a Good Neighbor." We mentioned dust, noise, and careless trucking as three main nuisance contentions made by complaining neighbors whose homes had gradually surrounded the plant originally isolated by distance. We pointed out that the safety afforded by the original zoning can quite easily be upset by reclassification if enough pressure is brought to bear by indignant taxpayers allegedly hurt by the plant operation. The right of prior occupancy seldom enjoys the immunity it may legally deserve when uncontrolled dust powders the householder's property, machine noise or blasting disturbs the neighborhood quiet, or the heavy, rumbling trucks — too often carelessly driven — endanger children at play or create havoc with pavements.

We commend N.R.M.C.A.'s efforts to effect a common defense for its members who may be troubled. But we feel that much of the fault must be corrected by the few irresponsible operators — and quickly, if they are not to be engulfed by the wave of unpopularity sweeping toward them. Besides the co-operative good accruing to the industry from the elimination of these public nuisances, there is a more direct benefit to those who thus police their operations, to make their plants cleaner, healthier and more pleasant places to work in. The end result will be better personal relations with their employees.

Roy L. Peck

This is the 134th of a series of ads featuring leaders of the Concrete Products Industry who are stepping up block production with Besser Vibrapac machines.

Another BESSER BOOSTER

South Dakota Plant Orders Second Besser on Vibrapac Agreement

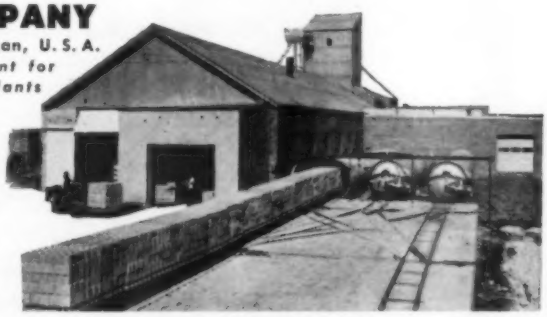
The Dakota Lime & Brick Company, Rapid City, South Dakota, started in the concrete block business in 1947. A year later they installed their first Besser Vibrapac on the Vibrapac Agreement. The satisfactory performance of this first machine, plus the profits made, prompted the company to secure another Besser in 1953. This was also on the Vibrapac Agreement.

Les Kennedy, President of the Dakota plant, states: *"The Vibrapac is unquestionably the best equipment available to produce high quality block in high production with a minimum cost for maintenance"*. He should know. His opinion is based on years of experience with Vibrapac equipment.

A modern, well-equipped plant with cash outlay greatly reduced under the Vibrapac Agreement, and with adequate stocks of aggregate within ½ mile of the plant, paved the way for success in the block business. This South Dakota plant is definitely on the way.

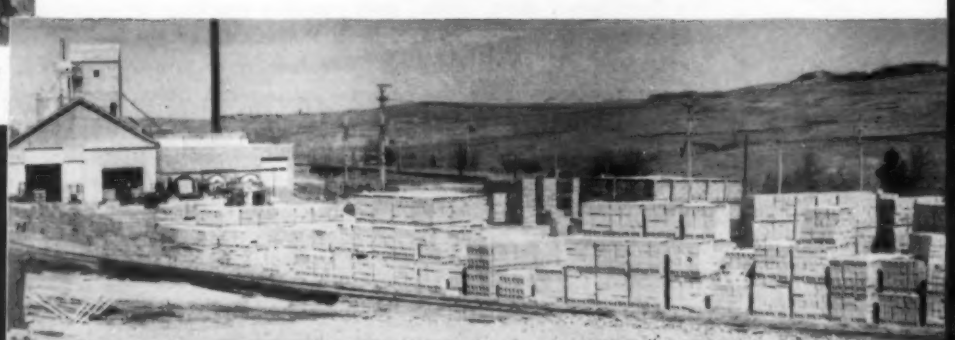
Les Kennedy, President of Dakota Lime & Brick, reading his copy of the Besser Digest.

BESSER COMPANY
Box 131, Alpena, Michigan, U. S. A.
Complete Equipment for Concrete Block Plants



Autoclaving in cubes. This is one of the first plants to employ high temperature presetting and high pressure steam curing of block.

New Vibrapac in the Dakota plant. No machine operator required. No manual lifting. Off-bearer merely guides the Besser Power Hoist.



Exterior view of plant which has an unusual location insofar as it is located within ½ mile of sources of cement, lightweight aggregate and sand and gravel.

Besser power cubing of block facilitates loading of block . . . speeds up deliveries.

NATIONAL HOUSING CENTER, WASHINGTON, D.C., where Besser maintains a permanent exhibit of concrete masonry. Be sure to visit this fine display.

BESSER VIBRAPAC

first in concrete block machines

A 8890

News of the Concrete Industries

Latin-American Demand For Concrete Block Soars As Building Boom Grows

"A simple way to measure how fast Latin-America is growing is to look for the big American (U.S.) concrete block machines." That is the opinion of John O'Donnell, an engineer who is introducing Besser block machines in Central and South American countries and arranging to send Latin-American engineers to the Besser plant at Alpena, Mich., for brief instruction courses. (A plant-trained man, he stated, can set up an 8-man crew within two weeks.)

According to Mr. O'Donnell, there is an "almost incredible" demand for concrete block. He pointed out that three machines are being operated 18 hours a day in Mexico City, where a rapidly expanding population (nearly 4,000,000 at present) calls for large quantities of building materials. In Caracas, Venezuela, ten machines are working. Venezuelans are the "best" customers; they are able to buy more machines because their oil brings them enough dollars to order the equipment.

Mr. O'Donnell added that the demand for the machines would be even greater if Latin-Americans had dollars coming in for their export surpluses. In Argentina there are only three units. However, in Sao Paulo, Brazil, where new buildings are being erected at a fantastic rate, four Besser machines are trying to satisfy the soaring demand. Three more are being operated at top speed in Rio De Janeiro.

In the race for lower building costs concrete block is fast overtaking conventional red clay brick. In Mexico, where an entire family often works at the brick kilns, the cost margin is reported to be narrowing rapidly.

New Construction Technique Used by Marietta Concrete

Use of a new technique in the construction of a building in Nashville, Tenn., was announced by Robert D. Johnson, manager of the Marietta Concrete Corporation plant.

Precast concrete panels, 8 by 24 ft., have exposed aggregate for permanent outside walls. Weighing 6 tons each, the panels are trucked to the site, picked up in a horizontal position, righted in mid-air by a 25-ton crane, and placed in position. The new structure is being built for the Sears Roebuck Company.

About 16 months ago the Rocket Ready Mix Company was formed at Grand Junction, Colo. Today this concern is operating a flourishing ready-mix business in its new $75,000 plant and has formed a subsidiary, the Gunnison River Sand and Gravel Company. Partner-owners of the firm are A. S. and K. S. Mittry. The new sand and gravel venture will be under the management of Bob Robitaille.

Coming Events

October 1-3, 1956 — Pebble Beach, Calif. Semi-annual board of directors meeting, National Ready Mixed Concrete Association. Del Monte Lodge.

October 22-26, 1956—Chicago. 44th National Safety Congress and Exposition. Conrad Hilton, Congress, Morrison, and La Salle hotels.

October 24-25, 1956—Montreal. 9th annual regional conference, American Concrete Institute. Sheraton-Mount Royal Hotel.

October 29-31, 1956—St. Louis. 6th annual short course school of instruction, American Concrete Pipe Association. Chase Hotel.

November 12-19, 1956 — Tucker's Town, Bermuda. 8th annual convention and meeting, American Concrete Pressure Pipe Association. Castle Harbor Hotel.

February 11-14, 1956—Los Angeles. 27th annual meeting, National Ready Mixed Concrete Association. Statler Hotel.

February 25-28, 1957—St. Louis. 37th annual convention, National Concrete Masonry Association, and 10th biennial show, Concrete Industries Exposition. Kiel Auditorium.

Federal Highway Ruling Sets Overload Tax Rate, Provides Fuel Refund

The federal highway tax on trucks weighing 26,000 lb. and over, according to the new Federal Highway Act, is to be at the rate of $1.50 per 1,000 lb.

In the Federal Highway Act is a provision for an additional 1 cent of gas tax. According to a recent Internal Revenue Bureau ruling, all gasoline purchased on and after July 1, 1956, which is used otherwise than as a fuel in a highway vehicle, may receive a 1 cent per gallon refund. Gasoline used in truck mixer motors and yard vehicles qualify for this refund. However, an accurate record must be kept to show the consumption of such gasoline. No special forms are required to keep such records. It is up to each producer as to how he will do it. Claims for such refunds must be filed on or before September 30 of the year in which the one-year period ends. The year runs from July 1 to June 30. Claims are filed with the district director of internal revenue.

Diesel fuel and special motor fuels (liquid petroleum, etc.) are also exempt from the tax if they are not used in a vehicle which travels the highways. Any amount of credit to which a taxpayer may be entitled, with respect to the payment of the increase in tax on diesel fuel and special motor fuels, may be claimed on Form 720, filed for a quarterly period. Evidence of non-highway use must be supported substantially in the form prescribed in existing regulations relating to tax-free sales of such fuels.

In view of the fact that considerable gasoline is used in operating the mixer motor on ready-mixed concrete trucks, producers are justified in keeping an accurate account of the material thus used and filing for a refund. Remember, this refund under the new Federal Highway Bill is for only the 1 cent of gasoline tax.

At Garden City, Kans., the Brown Supply Company, with headquarters in Lubbock, Tex., is opening a plant to manufacture concrete irrigation pipe. This concern has installed approximately 100,000 ft. of irrigation pipe since March of this year.

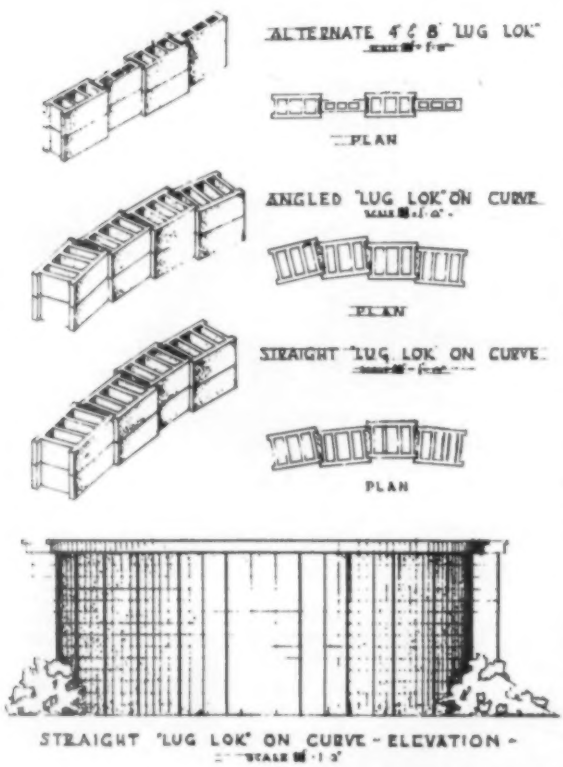
• Pictured above are N.C.M.A. President and Mrs. Earl W. Peterson, aboard the boat during one of the extracurricular events scheduled for those attending the recent board meeting of the National Concrete Masonry Association in Victoria, B.C.

• Washington (state) producers were hosts at a scenic boat trip through Puget Sound to Illahee State Park, where those attending the N.C.M.A. meeting enjoyed a salmon barbecue picnic. In the picture below, several members and guests are shown relaxing at the park.

New Architectural Effects Achieved in Stacked Bond

A striking departure from the usual method of laying up stacked concrete masonry walls has been developed by John Quincy Adams, A.I.A., of Columbus, Ohio. Known as the "Lug-Lok" system, it achieves a pleasing fluted or shadow effect by offsetting alternate block which are interlocked at the protruding ends. The keyed cavities are filled with cement grout. A variety of interior and exterior design patterns are possible for straight, angled, or curved surfaces using most standard lug end units.

The Lug-Lok principle, according to Mr. Adams, eliminates the problem of cracks in vertical joints because all are filled with grout, giving them added thickness and strength. None of the mortar joints are exposed. Where plaster furring is required, Lug-Lok patterns provide extra air space. Horizontal reinforcement of the type placed in walls of standard bond is recommended, but vertical reinforcement is not necessary.



Mr. Adams states that stacked Lug-Lok sections at required spacings furnish an architectural motive as well as effective expansion provision for unusually long ordinary block walls laid in stacked bond. The advantage on an angled Lug-Lok design as the acoustic surface for side wall panels in buildings such as schools, theatres, and auditoriums was also noted.

Our Front Cover

Here is proof of the fact that ready-mix has not suffered greatly in providing the concrete for even the most modern office structures of steel and glass exteriors. The picture shows a portion of the Concrete Block and Products Company's fleet of mixer trucks. This firm supplied over 30,000 cu. yd. of concrete for the structural frame and floors of the new central staff office building of the Ford Motor Company, Dearborn, Mich.

New North Carolina Facility Produces Block, Specialties

Recently completed, the Piedmont Block Company, Inc., Jamestown, N. C., is now producing concrete block and specialty items, including ready-made outdoor fireplaces, incinerators, and fence posts.

Located on a 6½-acre site, the plant consists of three buildings, and utilizes 700 ft. of rail track. Capacity is 7,000 blocks per day on one shift; 12,000 per day on two shifts.

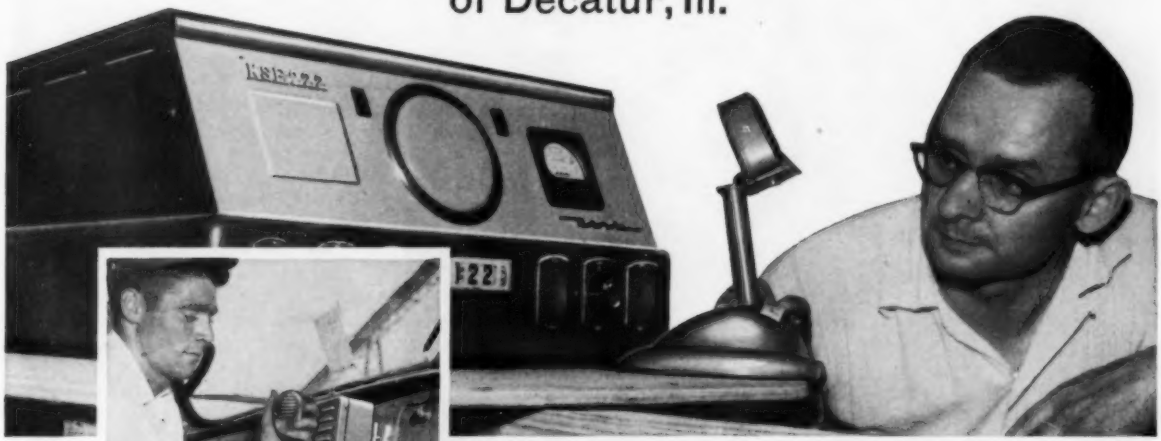
The block manufacturing unit features a new Besser block machine, which produces a uni-pressed-top block, a block that is flat and square on all sides with no burr or machine marks.

Twenty cars of aggregate can be stored in the new type aggregate storage silo, which has four compartments. The silo is 30 ft. in diameter and 32 ft. high, with a tunnel running beneath. Al Flock, of Greensboro, heads the $150,000 enterprise.

The Frankfort Transit Mix Concrete Company, recently acquired by Joseph Barker of Greensburg, Ind., is moving its operations to a new plant at Frankfort, Ind.

2-WAY RADIO

makes satisfied customers for Travers Supply Co. of Decatur, Ill.



Photos Courtesy Decatur Herald Review

SPEEDS READY-MIX CONCRETE DELIVERY

Direct from the site, Ralph Calfee radios dispatcher John Mosser that another yard is needed to complete the job.

HERE'S HOW RADIO HELPS YOU

John Stoune, Travers' manager, was arriving at a job in his radio equipped station wagon. Dispatcher Jim Mosser radioed, wondering about a gravel truck due on the job. Stoune answered, "He's dumping the load now—should be back in 20 minutes." Dispatcher Mosser knew exactly when he could schedule that truck for another job. A mixer returning to the plant was heard reporting mechanical trouble. A service truck was immediately sent to him and a spare truck dispatched to fill his next order—as much as an hour saved, not to mention the finisher's temper if he had run out of cement.

If forms aren't ready, the dispatcher gets the report in 30 seconds and can direct the mixer to another site nearby. When an estimate runs short, a fast radio call—direct from the job—gets the concrete there to finish the job. Loose ends at the end of the day are cleaned up easier with radio—drivers and batch plant men get home on time, and expensive overtime payroll is slashed.

With constant dispatcher contact and control, every truck does a bigger job every day, making a more efficient, more profitable operation. And customers are kept serviced, happy and *loyal*.

HERE'S WHY MOTOROLA DOES THE JOB BETTER

Motorola consistently supplies more mobile and portable radio than all others combined . . . proof of acceptance, experience and quality. The only COMPLETE radio communications service—specialized engineering . . . product . . . customer service . . . parts . . . installation . . . maintenance . . . finance . . . lease.

VERSATILE—Motorola produces the greatest variety of 2-way radio equipment available—equipment that can be combined to form a custom-made system at production line prices.

RUGGED—It is built to take the severe beating that any ready-mix work imposes on it—proven in use for long life, dependability and economy.

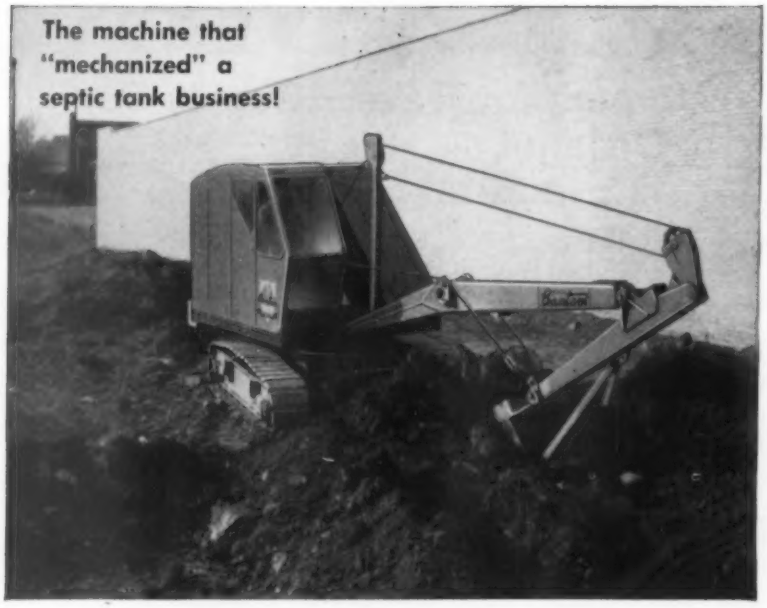
SERVICE—There is a Motorola Service Station near you. Motorola offers the most complete national service set-up—700 Authorized Service Stations, on call 24 hours a day.

TERMS—You can have Motorola 2-way radio on purchase, time payment, or lease (with or without equity).

Get the *full* facts from a Motorola Communications Engineer. Write, phone or wire TODAY!

MOTOROLA COMMUNICATIONS & ELECTRONICS, INC.

A Subsidiary of Motorola, Inc., 4501 Augusta Boulevard, Chicago 51, Illinois



19 BANTAMS

help build million-dollar business!

That's the success story of M. S. Eisenhart, York, Pennsylvania. In business only 8 years, his big expansion started 5 years ago with one BANTAM replacing slower, costlier digging and installing methods. Since then he's added a fleet of 19 BANTAM back hoes, both carrier and crawler mounted, for his busy schedule of trenching and excavating operations in a 5-state area. He reports: "My operators claim that they are the finest ⅜-yd. machines when it comes to speed, ease and operation."

BANTAM Method Cuts Digging and Handling Costs

BANTAM makes quick work of all digging and handling jobs with its fast cycle . . . makes the work easy for the operator with simplified mechanical controls. Nine easy-change BANTAM-built attachments equip you for high-speed handling of any job you have.

Helping keep profits higher is a BANTAM specialty—requiring far less maintenance, BANTAM spends more time working and earning. It's true in this case and with all the thousands of BANTAMS in digging, handling and yard work everywhere!

Get all the money-saving facts on the ⅜-yd., 6- and 7-ton BANTAM. Mail the handy coupon.

World's Largest Producer of Truck Cranes and Excavators

SCHIELD Bantam Co.

SCHIELD BANTAM CO., CP-46
298 PARK ST., WAVERLY, IOWA, U.S.A.
Please send me full information on the BANTAM:
☐ carrier mounted ☐ crawler ☐ self-propelled with ☐ back hoe ☐ backfiller ☐ shovel ☐ clam ☐ crane ☐ pile driver ☐ drag.

Name.....Title.....
Company.....
Address.....
City.....State.....

N.Y. Coal Adds Ready-Mix At Springfield, O., Plant—Second Facility to Be Built

Spokesmen of the New York Coal Company have announced that the firm will erect a second ready-mix plant in Springfield, Ohio, the first operation having been built there last summer. Present capacity is 225 cu. yd. per hour.

Actually, two of the four divisions of the company are conducting operations in Springfield. The Basic Constructions Division is turning out ready-mix, and the General materials Division supplies the aggregate for that operation. New York Coal Company has seven other plants in southern Ohio. (Its headquarters are in Columbus, not New York, and it does not produce coal.)

All of the company's 125 trucks are equipped with two-way radio facilities.

Minnesota Ag Instructors Attend Masonry Workshop

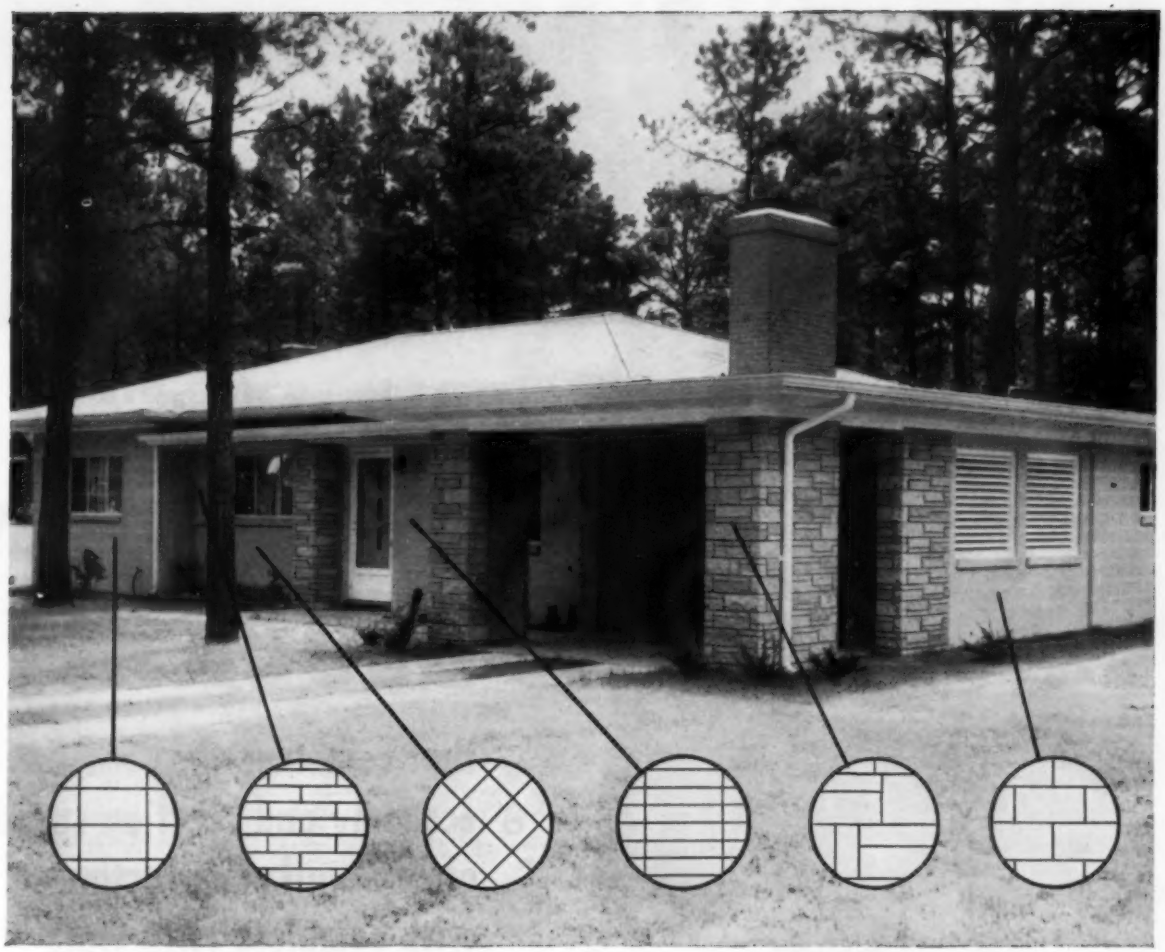
A workshop on concrete masonry techniques was held recently at the Fergus Concrete Products Company at Fergus Falls, Minn. Joint sponsors of the project, which was organized for the benefit of vocational agriculture instructors, were the Minnesota Concrete Products Association and the agricultural department of the University of Minnesota. V. J. Meyers and B. G. Sneva, both of the Portland Cement Association, assisted in organizing and conducting the workshop.

According to H. C. Lampy, the course was one of several conducted in the state to familiarize agriculture instructors with the principles of good masonry construction and the application of masonry to farm structures.

N.C.M.A. Plans Conferences On Sales and Merchandising

On September 13 the National Concrete Masonry Association will hold its first sales and merchandising conference at the Sherman Hotel in Chicago. Purpose of the meeting is to acquaint member companies with the procedures for extending the uses of concrete masonry through new and improved promotional and educational methods.

This is the first in a series of five regional sales and merchandising conferences, all of which will be open to N.C.M.A. representatives of member companies. A nominal registration fee will be charged to cover the expenses of the meeting.



. . . opportunity knocks six times!

New architectural effects are constantly being created with modern concrete units of various shapes and textures. And each new design contributes to the rapidly increasing acceptance of exposed concrete masonry for exteriors.

Here are six examples that combine to give this modest home a high-priced look:

1. 8″ x 16″ block—stacked bond
2. Split block—running bond
3. 8″ x 8″ block—diamond pattern
4. 4″ x 16″ block—stacked bond
5. Split block—ashlar pattern
6. 8″ x 16″ block—running bond

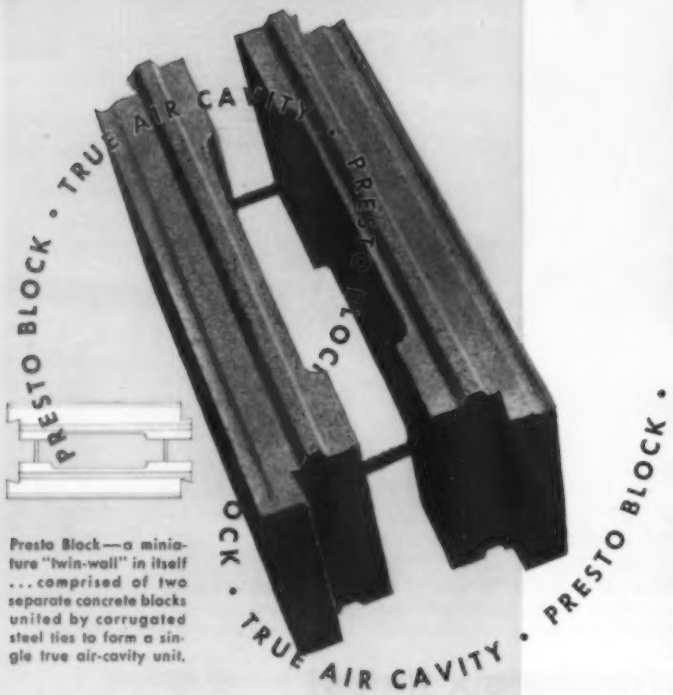
When you suggest imaginative combinations like this for your masonry units, you step out in front of competition . . . develop opportunities that pay off in easier, more profitable sales.

For the most profitable production, include Lehigh Cements in your plans. Remember, there's a Lehigh Cement to help you produce quality units with *any* manufacturing process.

- LEHIGH PORTLAND CEMENT
- LEHIGH EARLY STRENGTH CEMENT
- LEHIGH MORTAR CEMENT
- LEHIGH AIR-ENTRAINING CEMENT

LEHIGH PORTLAND CEMENT COMPANY
Allentown, Pa.

PRESTO BLOCK INTRODUCES



Presto Block—a miniature "twin-wall" in itself . . . comprised of two separate concrete blocks united by corrugated steel ties to form a single true air-cavity unit.

A TRUE AIR CAVITY BLOCK...

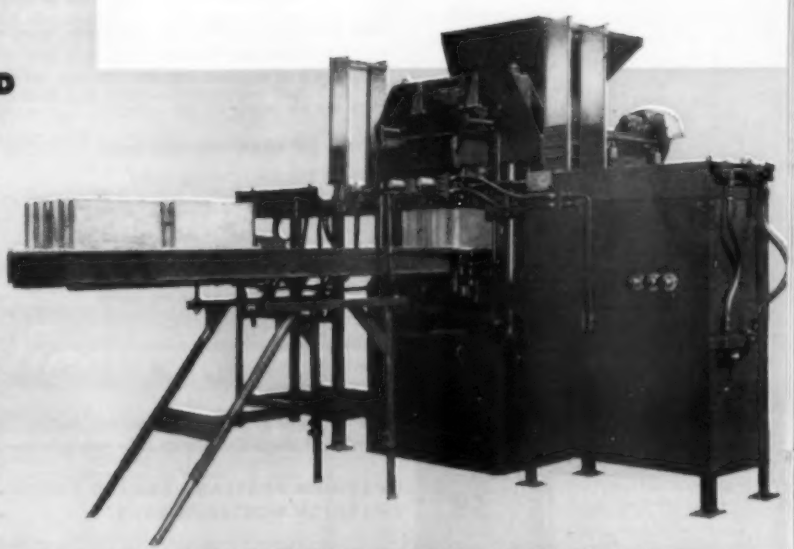
that combines the economy and erection speed of dry-wall construction with complete twin-wall insulation.

AUTOMATICALLY PRODUCED at 4 to 6 cycles per minute

(depending upon aggregate used)

Presto Blocks are automatically produced on the same performance-tested hydraulically-operated, electronically-controlled machines used by hundreds of block plants in the manufacture of standard masonry units. Presto Blocks are produced at the same speeds, at the same cost, and with the same aggregate as conventional concrete block.

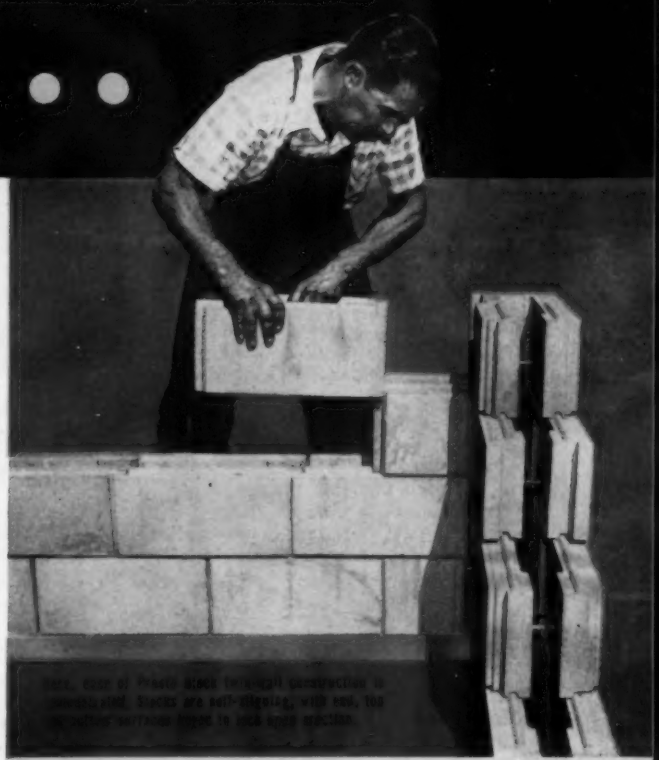
The most advanced features of hydraulic-electronic operation are built into precision-manufactured Presto Block machinery and equipment.



Presto Block Machines are manufactured by Columbia Machine under U. S. and world-wide pats. and pats. pending.

PRESTO BLOCK . . . A DYNAMIC NEW

THE FIRST REVOLUTIONARY ADVANCE IN MASONRY IN 20 YEARS . . .



PRESTO BLOCK ENDS THE SEARCH FOR A SINGLE-UNIT TRUE AIR-CAVITY CONCRETE MASONRY BLOCK

Today, you can benefit by these long-wanted consumer and manufacturing advantages that give cost-conscious builders, architects and homeowners a more versatile building unit at lower in-the-wall cost.

COMPLETE AIR-CAVITY INSULATION

Only Presto Block builds a true air-cavity wall for complete sound, temperature and moisture insulation. Each Presto Block is actually a miniature "twin-wall" in itself — comprised of two separate concrete blocks united by corrugated steel ties.

FAST, EASY ERECTION

Presto Blocks are keyed at end, top and bottom to lock upon erection. No mortar is required until several courses have been laid; then the joints may be speedily pointed by hand or with a mortar gun.

VERSATILE

Presto Block lends itself to every type of home and commercial construction. Simplicity of erection makes Presto Block the ideal building unit for "do-it-yourself" projects.

ECONOMICAL

For all its built-in "extras" Presto Block costs no more to manufacture than conventional concrete masonry. Produced with the same aggregate — and at the same production speeds — as standard concrete block.

FRANCHISES

. . . for complete information in regard to franchise arrangements . . .

Write, wire or phone . . .

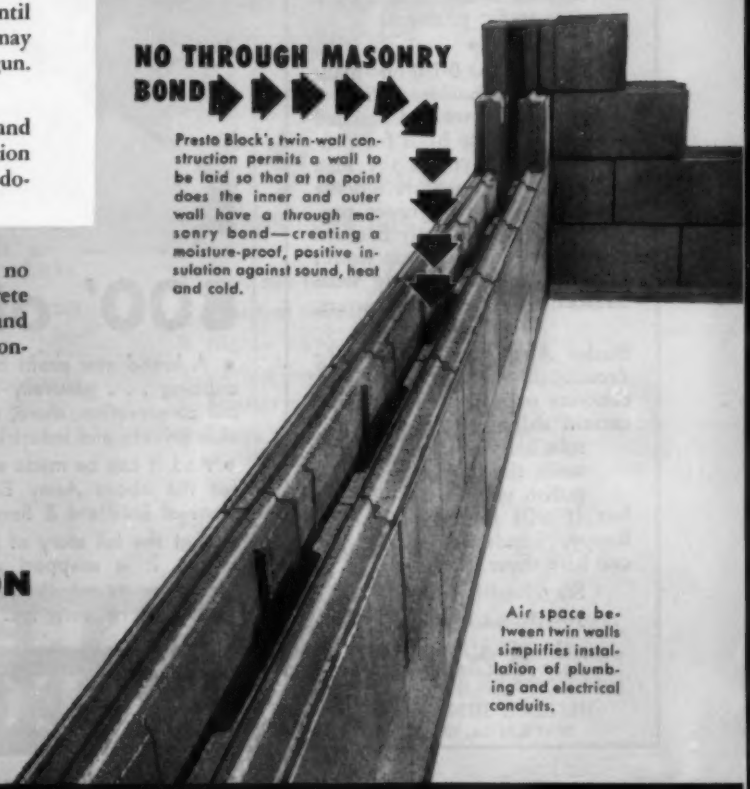
PRESTO BRICK MACHINE CORPORATION

Empire State Building, New York, N. Y.
Phone CHickering 4-7288

MEMBER NCMA

NO THROUGH MASONRY BOND

Presto Block's twin-wall construction permits a wall to be laid so that at no point does the inner and outer wall have a through masonry bond — creating a moisture-proof, positive insulation against sound, heat and cold.



Air space between twin walls simplifies installation of plumbing and electrical conduits.

BUILDING MEDIUM . . . PRESTO BLOCK

COMMENT
from the
BUTLER ENGINEER

. . . of traffic tangles and racing 34E pavers

Overheard at the Ready Mixed Show:

"So you want me to cut my price? Look, this equipment will pay you a profit for years to come. I only make a profit on one sale — and you want to cut me out of that!"

•

The other day I drove from Waukesha to Milwaukee. Had to slam on my brakes to dodge a truckload of concrete block swinging out of a block plant (a Butler customer). In back of me (and he hit *his* brakes) was a transit-mix truck from a Waukesha ready mix outfit (another Butler customer). After I swallowed my heart I started to pass the block truck but had to swing back to avoid a transit-mix truck from Company Y in Milwaukee (another Butler customer). All right, don't believe this: booming along in back of Y's truck was another transit-mix owned by Z (another B-c-). Kind of a concrete traffic problem!

•

With the Butler 0-1-0 one-man-operated Roadbuilders' Plant I rather thought we had reached a pretty ultimate high for production. Now comes the idea of adding an aggregate bin for one size of stone (pre-set controls and automatically batched of course). Such a set-up would play ring-around-a-rosy with THREE 34E dual drum pavers.

•

Butler Automatic Batching (roadbuilders, ready mix or concrete products) will not do certain things. It won't

mix baby's formula
wash the dishes
polish your car

but it will make you such a happy, handsome profit you can hire those jobs done.

Stay healthy, wealthy and you won't need to be wise

The Butler Engineer

BUTLER BIN COMPANY
WAUKESHA, WISCONSIN

● Recently repowered by a 3-cylinder diesel engine, this 8-ton Plymouth yard locomotive is doing a giant's job for Julius Porath and Son Co., concrete producers of Detroit, Mich. Handling as many as 12 cars at a time, this lightweight "dinkie" shuttles incoming shipments of gravel from a railroad siding to the company's ready-mix plant. The new engine is a 102-hp. Detroit diesel unit supplied by Peninsular Diesel, Inc., of Detroit.

Armour Research Foundation Plans Builders' Conference

Co-ordinating research and development planning to meet building industry problems resulting from architectural innovations will be the theme of a modern builders' conference to be held December 6 and 7.

Appropriately, the conference, dedicated to the advancement of building technology, will be held in Chicago's new 41-story $40,000,000 Prudential Building.

The meeting, sponsored by Armour Research Foundation of Illinois Institute of Technology, will be devoted to consideration of research and development from the viewpoint of the architect, the materials manufacturer, the contractor and engineer, and the realtor and building operator.

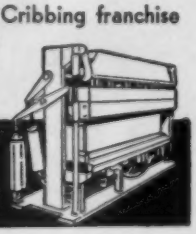
262' x 12' retaining wall partially completed for U. S. Engineer Corps in California . . . using Cooper Concrete Cribbing made on PreCaster

800' of cribbing daily

● A brand new profit opportunity for the block manufacturer . . . concrete cribbing . . . generally adaptable for highway, railroad, flood walls, dams, soil conservation, shore, river and harbor protection and conservation of valuable private and industrial property.

● And it can be made economically on the *PreCaster*. The concrete cribbing for the above Army Engineers installation in California was made in the plant of Bradford & Berry, Arcadia, California on a *PreCaster*.

● Get the full story of how you can can get the Cooper Cribbing franchise before it is snapped up for your area . . . how with small investment *PreCaster* can up your profits. Write today to PreCaster Inc., 5217 Beech Street, Cincinnati 17.



PRECASTER

NEW! THE GREAT CHAMP

"100" Silver Streak

Here's a lift truck you'll be proud to own

FIRST IN PERFORMANCE

This great new Champ "100" Silver Streak is setting new daily production records. It's powerful and economical to own and operate. Truly a great, all-around plant lift truck. 4,000 lb. capacity at 24" load center. Weighs approximately 6,500 lbs. Overall width is just 59". Length is 110", less forks. 49" to top of hood. 4-speed transmission. You can now own this sensation-performing Champ "100" for as little as $4.00 per day, on easy payment plan. Call today for a demonstration.

9 REASONS WHY YOU SHOULD OWN THIS NEW CHAMP

1. Provides faster plant operation
2. Greatest versatility
3. Highly maneuverable
4. Perfect towing without trailer
5. Shorter turning radius
6. Large tires for better operation over rough terrain
7. Better operating visibility
8. Fold-back forks
9. Chrysler industrial engine

Pioneers of Lift Trucks for the Masonry Industry

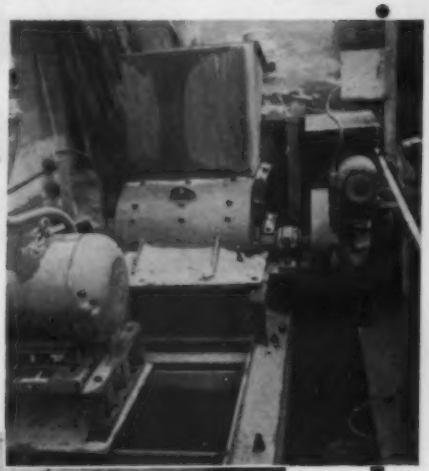
DEALER INQUIRIES INVITED.

CHAMP CORPORATION
2500 N. Rosemead Blvd., El Monte, Calif.

Builders of model 100, 200, 300 and 600 lift trucks. There is a Champ for every need!

RECLAIMS 9 TONS of HAYDITE BLOCKS PER WEEK

...PAYS FOR American HAMMERMILL IN 6 MONTHS!



● This American Series 24 Hammermill is crushing culled Haydite blocks up to 12" x 8" x 16" to reusable 3/8" material. With Haydite priced at $5.50 per yard, this manufacturer paid for his American Hammermill in less than 6 months operation.

Culled Haydite, Concrete or Cinder Blocks can be easily crushed to minus 3/8" material and mixed with new material. The resulting savings quickly pay for the cost of the equipment and give you a substantial profit thereafter, as well as eliminating the hauling away of culls.

WRITE FOR LITERATURE DESCRIBING COMPLETE LINE OF AMERICAN HAMMERMILLS

American PULVERIZER COMPANY

Designers and Manufacturers of Rock Crushers and Pulverizers

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Nailable Cinder Block Corp. Cited for Safety Record

One full year without an accident has won for Nailable Cinder Block Corporation, Brooklyn, N. Y., a safety award from the State Insurance Fund, according to word from Henry C. Quaritius Jr., president of the company. This concern produces in excess of 3,000,000 8x8x16-in. equivalent blocks annually.

In order to encourage even greater safety efforts, Mr. Quaritius offered to furnish safety shoes at one-half cost. A mobile unit will be sent to the plant to fit the men properly.

Mr. Quaritius paid special tribute to his plant superintendent, Ellis Barbour, for "setting an outstanding example of safety and wholehearted cooperation with management." Mr. Quaritius is president of the New York State Concrete Masonry Association and chairman of the Accident Prevention Committee of the National Concrete Masonry Association.

Springfield, Ill., Company Buys Austin-Western Plant

Purchase of the former factory of the Austin-Western Company at Rochelle, Ill., by the Midwest Pre-Stressed Concrete Company of Springfield, Ill., was announced recently.

Operations are scheduled to begin in the near future, according to J. O. Whitlock, general manager of Midwest, which manufactures prestressed reinforced structural members for large buildings and bridges. E. L. Peck will be plant manager.

Natl. Fire Protection Assn. Issues New Safety Standard

The revised edition of a fire safety standard establishing definitions of types of building construction, NFPA No. 220, *Standard Types of Building Construction*, has just been published by the National Fire Protection Association, according to Robert S. Moulton, technical secretary of the association.

The standard is intended to serve as a guide to other N.F.P.A. committees and others who may wish to specify structural requirements without detailing specific assemblies of materials.

Current revisions include a new definition of "noncombustibility," as well as editorial changes. These were officially adopted by the N.F.P.A. at its recent annual meeting in Boston.

Standard No. 220 is available in pamphlet form from the N.F.P.A., 60 Batterymarch St., Boston, at 25 cents per copy.

IF YOU MOVE MATERIALS... YOU *NEED* A HYSTER INDUSTRIAL TRUCK

"King of Lift Trucks" the RC-150 handling concrete pipe 48 inches in diameter, 16 feet long and weighing 11,250 pounds. Working under very adverse ground conditions.

Pictured above is one of many typical examples of how Hyster® Industrial Trucks are helping to effect tremendous savings in the cost of handling Concrete Products.

Even if you are now using lift trucks or have never used industrial trucks of any kind, your Hyster dealer can show you how you can quickly realize more profit from your operation with these multi-purpose utility tools. Your Hyster dealer knows materials handling... he is an expert on the problems and their solution. He can help you with special techniques and cost reducing methods. Call him today...why not take advantage of his materials handling know-how? He is listed under "Trucks-Industrial" in your telephone directory.

HYSTER DEALERS GIVE YOU ALL 3!

1 **PLANNING**—your Hyster Dealer will plan your materials handling operation from scratch, or will analyze your present system to see if it can be improved.

2 **THE RIGHT TRUCK**—for your job from Hyster's complete line of industrial trucks (1,000-30,000 lbs.) and over 100 job-attachments for economical load handling.

3 **THE RIGHT SERVICE**—ample spare parts stock, shop facilities, factory-trained mechanics and an efficient field service that keep your Hyster lift trucks going on your job, wherever your job might be located. Hyster trucks are noted the world over for their low downtime.

Materials Handling Trucks from 1,000 to 30,000 pound capacities

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1026 MYERS STREET.....DANVILLE, ILLINOIS
HYSTER N.V. ....NIJMEGEN, THE NETHERLANDS
FOUR FACTORIES: Portland, Oregon; Danville, Illinois; Peoria, Illinois; Nijmegen, The Netherlands.

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with "EQUI-SPLIT"
NEW Precision Block Splitter

Precision
Cuts
1 ⅝" to 8"

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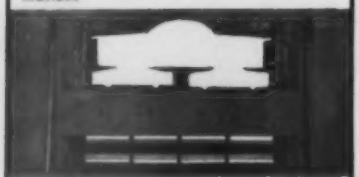
MORE PROFITS *for you!*

Here it is! "Equi-Split" . . . the concrete block splitter that *does away* with block breakage! "Equi-Split" applies *equal pressure* on full surface of block . . . regardless of irregularities . . . making good splits every time. "Equi-Split" is the way to meet the growing demand for split colored concrete blocks. Use the handy coupon below . . . TODAY . . . for full information!



SELF-EQUALIZED PRESSURE!

Four segregated blades on both top and bottom jaws adjust the "Equi-Split" to block form. *Self-equalized* blade pressure is assured by three equalizer-adjustment pressure stabilizers. Uniform pressure gives you uniformly good splits every time!

- FOR 16½" BLOCK
- MADE TO ORDER FOR SIZES TO 26" BLOCK

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Gentlemen: Please send me complete information on the "Equi-Split" Precision Block Splitter.

☐ Standard 16½" machine
☐ Special size machine to 26"
☐ Feeder attachments
☐ Portable equipment

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Of Plants and People

Richard W. Haller has been appointed sales manager for the Merle Hay Concrete Products Company, Des Moines, Iowa, according to an announcement issued by Robert Astley, president.

Aden M. O'Dell was recently named general manager of the Anchor Concrete Step Company, Decatur, Ill. He will be in charge of production and sales of steps, rails, and septic tanks in the Decatur area.

Construction of a plant for the Pre-Stressed Concrete Company, Inc., is planned at Eldorado, Ark., where structural members will be produced for bridges and other construction. Heading the firm as president is Charles T. Tune; W. L. Hoffman will serve as vice-president.

A 19-day strike ended recently at the Hamilton Concrete Products Company at Chattanooga, Tenn., when the management and representatives of the International Hod Carriers Building and Common Laborers Local 846 signed a new three-year contract. Under the new agreement workers will obtain wage increases of 10 cents per hour and additional increases in 1958.

At a new Baltimore, Md., location the Maryland Rainbow Rock Company, Inc., has gone into production of tinted concrete brick. Units are similar to conventional concrete block. Francis Lynch is president of the firm.

Facilities of Superior Concrete Accessories, Inc., will soon be housed in a new plant in Franklin Park, Ill. The new structure will have 70,000 sq. ft. of work area.

To introduce a new product, Holiday Hill stone, to its patrons, the Tidewater Concrete Block and Pipe Company, Charleston, S. C., recently invited them to attend a patio party at the plant. Walls and floor of the patio were constructed of Holiday Hill stone.

The Concrete Engineering Company, Knoxville, Tenn., which was organized two years ago by W. H. Baskerville and John Steel, is now prestressing and precasting beams and columns and floor slabs.

Guessing
Sand Moisture is
Expensive
for Concrete Producers

KNOW
Moisture Percentages
with the
C & W
ELECTRONIC
MOISTURE METER

Measures Moisture
Instantly • Automatically
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No question about it! The C&W New Improved Electronic Moisture Meter provides *facts* that save time and money.

This valuable unit positively controls slump. It eliminates adding water at job site if batch is too dry, and prevents "too wet" loads from leaving the plant.

Initial cost is low . . . and it operates as cheaply as a 100-watt light bulb!

Installed, tested, and adjusted by our engineers in your plant on your material, only $669.00.

WRITE FOR DETAILS

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1490 Franks Lane, Menlo Park, Cal.
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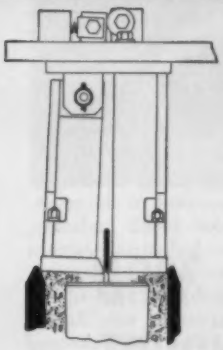
We are Associate Members of The National Ready Mixed Concrete Association

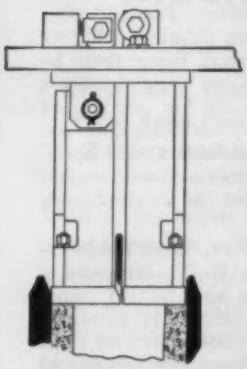
NATIONAL READY MIXED CONCRETE ASSOCIATION NRMCA

now BESSER gives you

UPT*

PLAIN END OR CORNER BLOCK With UPT, the core plate mark is now completely eliminated on the end of block. Perfects corners of buildings and ends of walls.





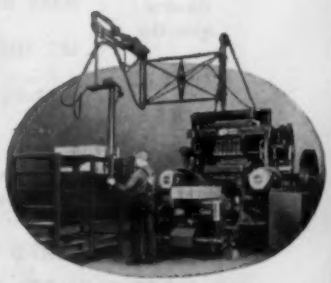
Upper drawing shows swinging stripper shoe contacting thick beveled division plate, ready to move to right — to contact stationary stripper shoe — to produce a block with U.P.T.

Lower drawing shows swinging stripper shoe—after clearing higher core plate — and contacting stationary shoe — ready to strip U.P.T. block.

FIRST IN PRODUCING A BUILDING BLOCK WITH UNI-PRESSED TOP*

Again Besser forges ahead with another FIRST in the Concrete Block Industry. This time it's U.P.T. . . . a block with *Uni-Pressed Top* . . . entire top surface made smooth. Note these new U.P.T. features:

- **Block has no machine marks, whatsoever.**
- **All six sides are now smooth.**
- **Concrete under core bar—packed the same density as rest of block.**
- **Higher division plate required, provides means for packing block edges better.**
- **Materially reduces grinding on floor filler units — as block is smooth.**
- **Makes perfect job of pressure grouting floor and roof planks — no weak points in center of block.**



BESSER VIBRAPAC — the fully automatic concrete block machine. Produces high quality masonry units, of any desired texture and density, at the lowest possible cost.

U.P.T. attachments are available in 3 core, 2 core and floor & roof filler block. Get all the facts from your Besser representative, or write:

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BESSER COMPANY

World's Leading Manufacturer of Concrete Block Machinery

ALPENA, MICHIGAN, U.S.A.

Natl. Cinder Concrete Products Assn. Holds Annual Summer Meeting

The annual summer meeting of the National Cinder Concrete Products Association was held July 30 and 31 and August 1 at the Chalfonte-Hadden Hall, Atlantic City, N. J. Many producers from Eastern plants attended the three-day meeting and enjoyed the facilities of the famous resort. The first day was spent in an inspection of several cinder concrete block installations at McGuire Air Force Base adjoining Fort Dix, N. J. The units in these buildings, furnished by Bethayres Concrete Products Company during the last three years of the vast construction program at the base, were the result of intensive promotion to the Air Force by Ted Leba, Washington representative of the National Concrete Masonry Association.

In this construction special attention had been given to pre-calculated location of construction joints, bond seams, and to the use of joint reinforcing. Air Force officials declared they were well pleased with the perfect record of all structures, which were without cracks of any type. The group witnessed an interesting demonstration of a typical "alert" at the A.F. base, in which jet planes were in the air within five minutes of a signal.

Charts prepared for the technical information of architects and engineers, showing the details of concrete masonry construction, were shown by Charles Lower, of Bethayres Company, and by Eastern Concrete Products Association, as excellent examples of this type of promotion of block. These charts are available upon request to the N.C.C.P.A., P. O. Box 95, Primos, Pa.

Speakers who discussed various aggregates on the second day of the meeting included William Atkins, of the Lelite Company; Martin Gelbman, of the Expanded Aggregates Corporation, Bangor, Pa.; Walter Warren, of the Waylite Company, Chicago, Ill.; and William Bower, whose company prepares cinder aggregates. The consensus of the meeting was that the block industry, especially in the industrial eastern portion of the country, is not dependent upon any particular type of aggregates and that many new aggregates are being used as industrial cinders become scarce.

Sigmund Westby, Portland Cement Association, Chicago, Ill., reported on the work being done by that organization to assist the block industry, especially on studies of block shrinkage, carbonization, aggregates, sales promotion, and development of the floor-and-roof market through the use of multiple-unit slabs.

William J. Shore, Shore Engineering, New York, N. Y., presented a very interesting and factual paper covering developments in autoclave curing and corrosion effects on block cured in autoclaves. His conclusions as to the causes of corrosion aroused much discussion.

The remaining sessions of the meeting were devoted to hearing from equipment manufacturers, who told of new developments in that field which are of interest to producers. Among the speakers were Jack Franklin, Besser Company, and Myron Hultmark, Stearns Company. Motion pictures were shown of a new type of cavity wall composite concrete unit which appeared to have all the requirements necessary for the construction of an efficient double wall.

The P&S Electronic Moisture Control Meter

continues to gain new friends each month

Meter used by

CONCRETE PRODUCTS MFG. CO.

Brentwood, Mo.

No human can control the moisture content of your mixes as perfectly as this scientific device.

*T. M. Reg. U. S. Pat. Off.—Pats. Pend.

Easy Control with the P&S METER

MAKE *ONE* SAMPLE MIX, OF DESIRED CONSISTENCY

SET THE DIAL TO THAT MILLIAMPERE READING

JUST PUSH THE BUTTON FOR EACH MIX THEREAFTER

The solenoid valve lets in EXACTLY enough water to duplicate the original mix

NO MORE CRACKED BLOCK FROM MIXES THAT ARE TOO DRY

NO MORE SLUMPED BLOCK FROM MIXES THAT ARE TOO WET

For further details write

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GOFF KIRBY READY MIX COMPANY DISPATCHES TRUCKS BY RADIO, SAVES MONEY ON HAULING

Cleveland, Ohio Firm Operates 70 Trucks From Four Plants—Finds General Electric 2-Way Radio Helps Keep Costs Down!

Goff Kirby is one of Ohio's largest ready mix concrete firms. Its rolling stock is a familiar sight on construction projects throughout the Cleveland area. Last year, Goff Kirby Ready Mix Company was the only outside concrete supplier to deliver ready mix to the Ohio Turnpike project.

32 Trucks Have G-E Radio!

Nearly half the company's fleet is G-E radio equipped. These drivers are in constant contact with each of the four GK plants. Dispatch orders, changes, and special instructions by radio help make sure that loads get to a job on schedule. When breakdowns occur, the GK repair vehicle is on the scene in record time.

Radio Helps Keep Hauling Costs Down!

Edwin Harper, Goff Kirby president, reports that most of the cost of concrete is in the hauling charges. Typical rental of a concrete truck in his city is $11.50 per hour. By eliminating truck waiting time and driver overtime you save money. General Electric 2-way radio helps keep these costs down.

2-WAY MOBILE RADIO

Radio Can Help Your Operation, Too!

Goff Kirby is a typical example of progressive management in the concrete business. Your G-E Communications Counselor can tell you of others, show you how G-E Progress Line Radio can save you money. Call him in, or, write: *General Electric Company, Communication Equipment, Section X5196, Electronics Park, Syracuse, New York.*

Progress Is Our Most Important Product

GENERAL ELECTRIC

Rx Ready Mix

By Harry F. Thomson

Effects of Prolonged Mixing

MOST specifications for concrete or projects of substantial size stipulate the minimum time of mixing for given types and sizes of mixers; these times are predicated on experience for obtaining uniform finished concrete. And some of the same specifications also name the maximum time of mixing which will be accepted; these limits are in many cases quite arbitrary and apparently based largely on assumptions as to decrease in quality for the work in hand after the named time limit has been passed. A wider understanding of the effects of prolonged mixing on the properties of concrete is to be desired.

For the ready-mix producer, the provisions of the A.S.T.M. specification for Ready Mixed Concrete, designation C94-55T, are the guide; these stipulations were outlined by a committee of experienced concrete men and may be considered typical of presently accepted good practice. The provisions for Mixing and Delivery given in Section 9 of that specification are as follows:

Sub (c)—When a stationary mixer is used for the complete mixing of the concrete, the mixing time for mixers having larger capacity than 1 cu. yd. shall be 1 minute plus 15 seconds for each cubic yard or fraction thereof in excess of 1 cu. yd.

Sub (e)—When the concrete is mixed in a truck mixer loaded to its rated capacity, the number of revolutions of the drum or blades at mixing speed shall be not less than 50 nor more than 100. If the volume of the batch is greater than the rated capacity, but not greater than that guaranteed by the manufacturer, the number of revolutions of the drum or blades at mixing speed shall be not less than 70 nor more than 100. All revolutions after 100 shall be at agitating speed.

Sub (g)—When a truck mixer or agitator is used for transporting concrete, the concrete shall be delivered to the site of the work and discharge shall be completed within ½ hour after the introduction of the mixing water to the cement and aggregates, or the introduction of the cement to the aggregates, unless a longer time is authorized by the purchaser.

As regards truck mixing, the provisions of paragraph (e) quoted above are highly significant. It will be noted that regardless of whether a mixer is loaded to its rated capacity or to its rated capacity plus ½ cu. yd., which is now guaranteed by most manufacturers, all revolutions of the drum in excess of 100 are to be at agitating speed in order to comply with the specification. Agitating speed for all truck mixers is defined elsewhere as 2 to 6 r.p.m. The speed of the drum should be reduced to not over 6 r.p.m., and preferably only 4 r.p.m. after an interval of 10 minutes. This requirement is a precaution against undue reduction in size of aggregate particles in the case of soft material, due to grinding. Other relative effects from fast and slow speeds will be discussed below. However, many truck mixers as now equipped cannot meet the range between mixing and agitating speeds named in the specification; and consequently this provision that all revolutions after 100 should be at slow speed is frequently violated.*

The provision of paragraph (g) quoted above, that under normal conditions ready-mix shall be delivered and discharge completed within 1½ hours after the comingling of the cement and aggregates, represents a conservative compromise of experience as to safeguarding the quality of the concrete. A prominent engineer some years ago maintained that concrete could be placed with safety so long as it remained plastic, even longer than 1½ hours.

Some specifications prohibit the

*The problem of mixer equipment to comply with this requirement as to range of drum speed will be discussed in a later article in this column.—Editors.

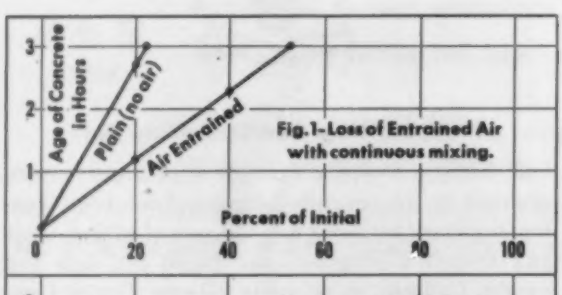


Fig. 1 - Loss of Entrained Air with continuous mixing.

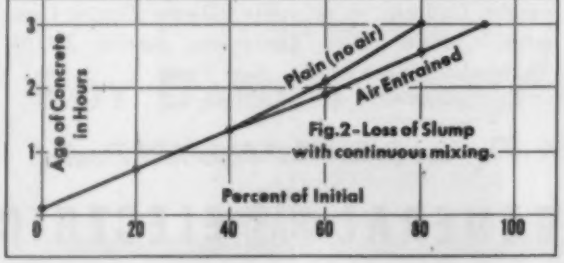


Fig. 2 - Loss of Slump with continuous mixing.

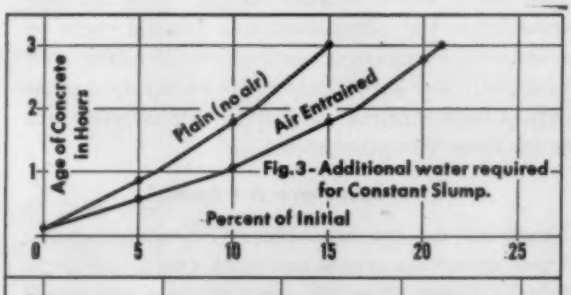


Fig. 3 - Additional water required for Constant Slump.

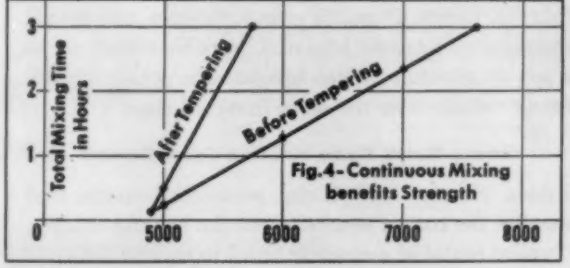
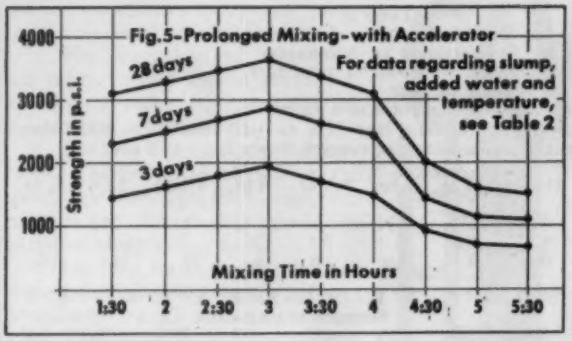
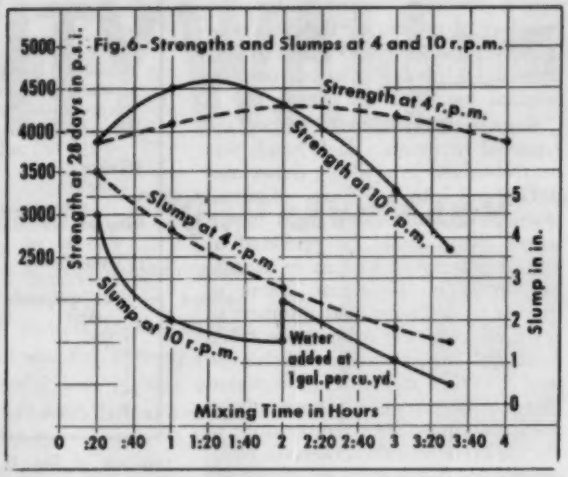


Fig. 4 - Continuous Mixing benefits Strength





placing of concrete after an interval of more than 30 minutes. The Army Corps of Engineers only a short time ago increased the maximum interval permitted on their civil construction from 30 to 45 minutes. Such a death knell as 45 minutes or even 1 hour on the interval for accepting concrete appears unrealistic in view of the vast experience that, under normal conditions, concrete is still "good" for a much longer interval. Even the 90 minutes set up in C94 can usually be exceeded without serious deleterious effects.

The engineering laboratories of the U. S. Bureau of Reclamation have published recently a report (No. C-802) bearing on this subject. This report entitled *Effect of Tempering after Prolonged Mixing or Standing on Various Properties of Concrete* presents the results of a new series of laboratory tests with both plain and air-entrained concrete handled in a building mixer. The cement content for plain concrete (non-air-entrained) was approximately 600 lb. per cu. yd. and the total air content was 2.5 percent; the air content of the air-entrained mix was 5.1 to 5.5 percent. The cycle of mixer speeds was 20 r.p.m. for a 5-minute mixing period; 10 r.p.m. for the remainder of a 1-, 2-, or 3-hour period; and 20 r.p.m. for 2 minutes after tempering to obtain uniform distribution.

Figures 1, 2, 3, and 4 give some of the results of these tests, which may be summarized as follows:

Figure 1—After continuous mixing for 3 hours the loss of entrained air in the plain concrete was 22 per cent of the original quantity, and in the air-entrained mix the loss was 44 per cent.

Figure 2—After 3 hours of mixing the loss of slump was 80 percent of the original for the plain concrete, and 94 per cent of the original for the air-entrained.

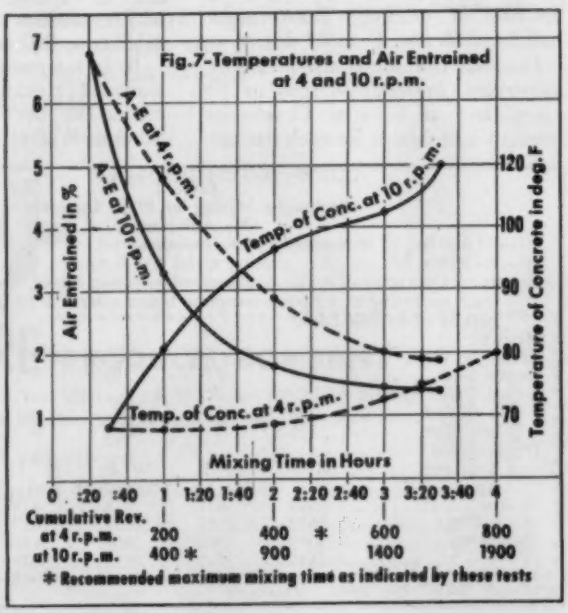
Figure 3—The additional water for tempering to the original slump after 3 hours was 15 per cent of the original for the plain mix and 21 per cent of the original for the air-entrained mix.

Figure 4—During continuous mixing for 3 hours the 28-day strengths for both plain and air-entrained mixes increased from approximately 5,000 p.s.i. to approximately 7,500 p.s.i. before tempering; and after tempering with water to the original slump the strengths for both mixes was approximately 5,700 p.s.i., or somewhat above the original strengths.

The discussion of the tests by the Bureau's laboratory is significant. It states—"Results indicated that continuous agitation of air-entrained concrete was increasingly beneficial in all instances up to 3 hours, when slump loss was not corrected, increasing compression strength 49 percent, static modulus of elasticity 8 per cent, and freezing and thawing resistance 25 per cent over values obtained from identical concrete mixed only 5 minutes prior to casting. Tempering these same concretes with plain water to restore slump resulted in higher strengths for periods to 3 hours and higher elastic module for periods to 2 hours."

These conclusions from mixing up to 3 hours would appear to confirm the opinion expressed above that the 90-minute interval proposed in C94 is conservative. It will also be noted that the air-entrained concrete was more sensitive to loss of air and slump than the plain concrete, during a 3-hour mixing period.

An independent study of the efects of prolonged mixing was conducted recently by the Mount Royal Paving and Supplies, Ltd., who are large producers of ready-mix in Montreal, Quebec, and vicinity. These full-scale tests with a modern truck mixer were undertaken after trouble was experienced with several loads of over-mixed or "burned" concrete. The objective was to establish a sound time-limit within which a load of ready-mix would be safe for delivery on jobs. We are indebted to the officers of that company, and especially to N. G. Zoldners, the com-



pany's concrete engineer, for the privilege of presenting the data contained in Tables 1 and 2 and in Figures 5, 6, and 7, based on the original test data.

Four runs of prolonged mixing are reported herewith. Each batch was central-mixed in a tilting mixer and discharged into a 5½-cu. yd. rated capacity high-discharge truck mixer, whose drum could be operated at agitating speed of 4 r.p.m. or at mixing speed of 10 r.p.m. Time of mixing or agitating and numbers of revolutions of the drum were taken from the time the tilter discharged into the truck mixer. The drum was stopped for 5 minutes at intervals for taking samples. The temperature of the concrete was also observed. Summaries of the changes in characteristics during the four runs follow.

Plain concrete (no admixture), mixed at 4 r.p.m. for 6 hours—data in Table 1. Developed maximum strength at 3½ hours; after tempering to restore slump, the strength after 6 hours' total mixing approximated that of the original concrete. Temperature rose from 68 deg. F. to 74 deg. F. after 6 hours of mixing.

Concrete containing air-entraining admixture and accelerator (calcium chloride) mixed at 4 r.p.m. upon return from job 1½ hours to 5½ hours mixing, when test was discontinued. Data shown in Table 2 and graphs of strength at 3, 7 and 28 days in Fig. 5. Developed maximum strength at 3½ hours. Thereafter strength was reduced with addition of water to restore slump (approximately three times as much water added as without accelerator); strength at 5½ hours approximately one-half of original. Temperature rose from 68 deg. F. to 87 deg. F.

Concrete containing air-entraining admixture, in separate runs at 10 r.p.m. and at 4 r.p.m. Graphs of strength and slumps for each run are shown in Fig. 6 and graphs of temperatures and amounts of entrained air are shown in Fig. 7. Regarding strength at 10 r.p.m., a rapid increase to the maximum at 1 hr. 30 min. is noted, with rapid decline thereafter; at 4 r.p.m. the rate of increase was slower, with the maximum at 2 hours, and slow decline thereafter. Regarding slump at 10 r.p.m. there was rapid decline from 4½ percent to 1½ per cent in 90 minutes, compared to decline from 5½ per cent to 1½ per cent in 3½ hours at 4 r.p.m. Regarding entrained air, at 10 r.p.m. there was a decline from 7 to about 2 per cent in 90 min. and at 4 r.p.m. there was the same decline in 3½ hours. Regarding temperature, at 10 r.p.m. there was an increase from 68 deg. to 95 deg. F. in 2 hours or 900 revolutions, and to 120 deg. F. in 3½ hours or 1,650 revolutions; at 4 r.p.m., in contrast there was a slow increase from 68 deg. to 70 deg. F. in 2½ hours or 500 revolutions and to 80 deg. F. in 4 hours or 800 revolutions.

It is interesting that among the loads of truck-mixed concrete included in the tests conducted by Stanton Walker for the N.R.M.C.A. in 1952 there were two loads which were operated at 4 and 11 r.p.m., respectively, somewhat like the runs reported in Figure 6. Although the data were not as complete as in the Montreal tests here reported, the trends as to strengths and reduction of slump during prolonged mixing were similar.

In a summary of observations based on his tests reported above, Mr. Zoldners stated that:

a. The rise of the temperature of the concrete is the best indication of mixing time limit. A 15 deg. F. increase of initial concrete temperature serves as a danger point indicator.

b. Tests show that *total number of revolutions* — not total mixing time—is of primary importance. 500 revolutions of the drum seem to be the safe limit for good concrete if no other factors influence the generation of heat.

c. Fast mixing, addition of accelerators (such as calcium chloride) and high initial temperature of the concrete will all shorten the safe permissible mixing time.

It will be noted that these observations direct attention to two factors which are not commonly considered controls — namely, temperature rise of the concrete, and number of drum revolutions. Of course, measurement of temperature is hardly practicable in ordinary delivery operations. But the number of revolutions can usually be noted as most truck mixers are now equipped with reliable revolution counters. In comparison with the suggestion of 500 revolutions given in paragraph (b) above, Stanton Walker has proposed 350 revolutions in his excellent contribution on ready-mixed concrete to the recently published symposium of the A.S.T.M. on the significance of tests and properties of concrete.

In recent correspondence Mr. Zoldners has made the following

Table 2
Prolonged Mixing of Concrete
Containing an Accelerator

Mix—2,500 lb., ¾ in. aggregate, air-entraining admixture.
Accelerator—2 percent calcium chloride.
Mixer—Rated 5½ cu. yd. agitator speed 4 to 6 r.p.m.
History of Concrete—Portion of rated load (1½ cu. yd.) returned to plant after 1½ hr.; agitation continued for test; samples drawn every half hour.

Mixing Time	1½ hr.	2½ hr.	3 hr.	3½ hr.	4 hr.	4½ hr.	5 hr.	5½ hr.
Slump	3 in.	2¼	¾	½	¾	2¼	2½	2½
Per cu. yd.	0	0.6	2.0	3.4	13	7	nil	nil
Cumulative	0	0	0.6	2.6	6	19	26	26
Temperature of Concrete	70° F.	75° F.	76° F.	78° F.	82° F.	85° F.	87° F.	87°F.
Age	Strength in p.s.i.							
1 day	548	698	725	637	637	327	251	251
3 "	1451	1814	1938	1716	1513	964	743	690
7 "	2318	2681	2849	2575	2433	1442	1141	1079
14 "	2672	2885	3274	2973	2796	1690	1362	1273
28 " Av. of 2.	3083	3442	3671	3345	3203	2017	1601	1530

Table 1
Prolonged Mixing of Plain Concrete
(No Admixture)

Mix—3,000 lb., ½ in. aggregate, no admixture.
Mixer—Rated 5½ cu. yd.; agitating speed 4 to 6 r.p.m.
History of Concrete—Regular batch mixed in tilting mixer, discharged into mixer-truck operating at 4 r.p.m.; sampling began after 3½ hr. agitation, and subsequently every half hour.

Mixing Time	3½ hr.	4 hr.	4½ hr.	5 hr.	5½ hr.	6 hr.
Slump	2	2½	3½	3	2¾	2½
Added water (gal.)						
Per cu. yd.	1½	1½	3	nil	nil	1½
Cumulative	1½	3	6	6	6	7½
Temperature of Concrete	68° F.	70° F.	70° F.	71° F.	73° F.	74° F.
Age	Strength in p.s.i.					
1 day	595	610	478	478	478	442
3 "	2035	2052	1601	1610	1628	1655
7 "	3035	3000	2406	2486	2513	2486
14 "	3547	3592	2911	3079	3071	3026
28 " Av. of 2.	3972	3901	3273	3318	3322	3318

recommendations to avoid overmixing in ready-mix operations:

1. For central-mixed concrete—All truck mixers should revolve at *agitating speed only*, unless the job is very close to the plant.

2. For truck (transit) mixed concrete — After initial mixing at full speed for the specified minimum revolutions, the drum should be switched to agitating speed.

3. On long runs or waiting at job sites, it is advisable to stop the mixer completely for 15 minutes at intervals. This is of utmost importance with air-entrained concrete.

Although some variation is to be expected in the effects of prolonged mixing of deliveries from different plants due to the characteristics of the cement, grading and hardness of aggregates, and other factors, the basic provision of C94 regarding delivery should be followed. This should be done regardless of whether the concrete is certified as complying with the A.S.T.M. specification—namely, (1) that central-mixed concrete should be agitated at not over 6 r.p.m. (and preferably only 4 r.p.m.); and (2) that truck-mixed concrete after the first 100 revolutions of the drum for initial mixing, should be handled at agitating speed only.

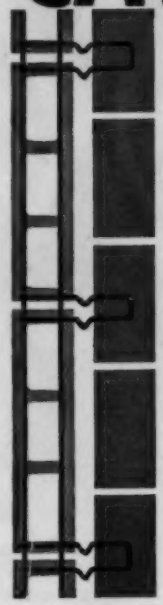
The two series of tests with prolonged mixing outlined above indicate that provisions in C94 for Mixing and Delivery are conservative as to protecting the original quality and safe as to insuring against "burned out" concrete being delivered.

A.C.I. Regional Meeting At Montreal October 24-25

The American Concrete Institute's 9th annual regional meeting, to be held October 24-25 at the Sheraton-Mount Royal Hotel, Montreal, Canada, will emphasize concrete construction problems encountered in eastern Canada and the northeastern part of the United States. It will feature inspection trips to sections of the St. Lawrence seaway project.

An entire session on prestressed concrete and lift-slab construction will be included in the program, as well as a symposium on winter concreting. Other papers will cover the effect of sand grading on air-entrainment, heavy-media processing of aggregates, scaling of sidewalks, impact hammers, bridge projects of the Quebec Department of Public Works, and concreting operations on the St. Lawrence seaway. Inspection trips are scheduled to the Montreal section and the Barnhart Island power development site.

CAVITY WALL data sheet



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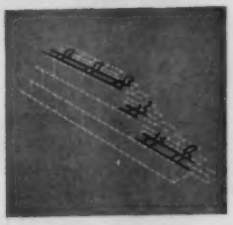

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POURING 2300′ DOWN A MOUNTAIN IN A 6″ PIPE: To pour anchor blocks for a new 24″ water line to Colorado Springs, General Concrete's new Jaeger truck mixers climbed 9700′ up Pike's Peak (a 17 mile haul that took about 80 minutes) then spent 40 minutes carefully discharging each 5 yd. batch down 2300′ of 6″ pipe. The 1100′ fall of the pipe carried the 5″ slump material by gravity. The pipe was flushed with water after each use.

Three mixers made the 235 yd. pour. "Handled the long haul and difficult pour in fine shape, with very satisfactory concrete", states Guy M. Elder Jr., of Guy Elder Construction Co., Denver contractors.

POURING HIGH, DRY AND MIGHTY FAST: The same Jaeger mixers that could dribble concrete down a 6″ pipe at the rate of 8 minutes per yard, made quick work of discharging 2″ slump concrete that was so stiff it had to be vibrated from the bucket. Job is pressure conduit under relocated U. S. Highway 85-87, near new U. S. Air Force Academy at Colorado Springs. Mountain States Construction Co., contractors.

You can do more with a 3-speed Jaeger

Like every other exclusive Jaeger operating feature, 3-speed transmission makes truck mixers more adaptable to job conditions and faster moving on the payload trip.

Within efficient engine speed range of 800 to 2000 rpm, you can fast-charge with drum at 16 rpm, shift down slow as 1½ rpm for long haul agitation, or adjust engine and drum speeds to discharge the stiffest concrete under any condition the job may call for. Enlarged diameter loader throat and 25% larger discharge blades also help to out-charge and out-discharge other mixers—often by actual minutes on low slump mixes.

Today's Jaeger mixers are also notable for their short center of gravity—for example, Jaeger 5½ yd. with rated load has 69″ c/g versus up to 77″ in other makes. And you have your choice of transmission, loader, water system and other equipment to fit your needs, with either separate engine or cab-controlled truck engine drive. For complete details, ask your Jaeger distributor—or write us.

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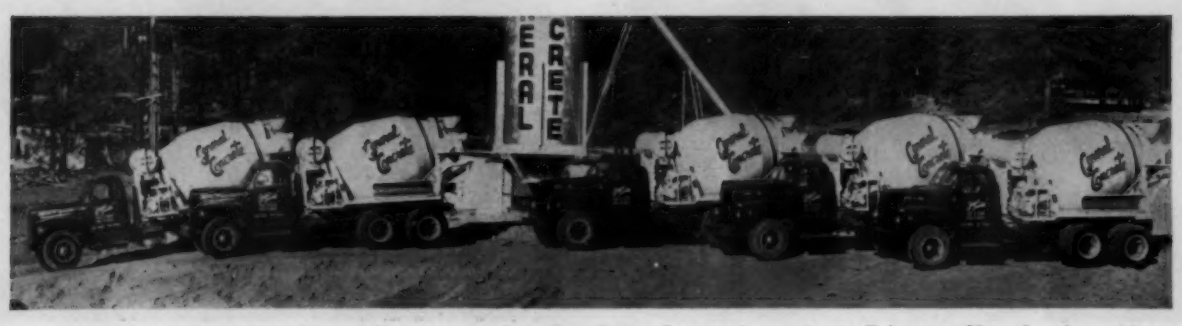
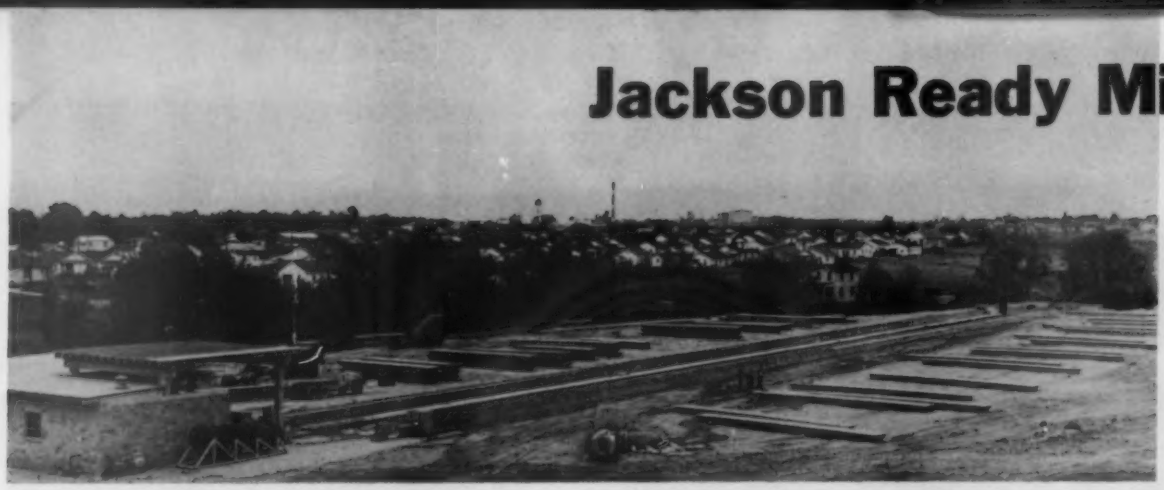


FASTER THAN RABBITS: General Concrete put their first 5 new Jaegers in service in February. Now they have 10.

Jackson Ready Mix



An overall view of Jackson's prestressing operation area showing the 400-ft. casting beds, the storage yard, and the shop and supply building, which also houses the boiler.

By BUREN C. HEROD

Another ON THE SPOT Report

ALREADY a leading producer of ready-mixed concrete and concrete masonry products, the Jackson Ready Mix Concrete Company of Jackson, Miss., has now added prestressing to its diversified operations. Installation of the first precasting and prestressing beds in Mississippi is another indication of the long range planning that characterizes the approach of W. H. Day, president of this company, to the potential of either new or established practices in the industry.

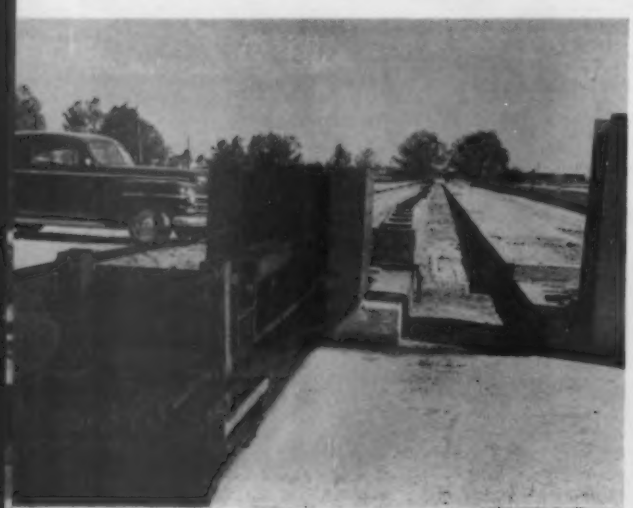
Envisioning a healthy growth for the city of Jackson, Mr. Day organized his ready-mix concern in 1946, and almost immediately the organization began to experience a development comparable to that of the community which it serves. When he subsequently took under consideration the addition of a masonry products operation, associates attempted to dissuade him on the ground that the area couldn't absorb any additional block production. Mr. Day, after a long look at the situation, took a more optimistic position and went ahead with his plans. These culminated with the start of operations in a new block plant in June, 1954.

Still looking ahead, Mr. Day weighed the potential business advantage to his concern in the area of marketing autoclaved masonry units. As a result, a high-pressure vessel was installed in the spring of 1955. On the premise that successful competition is based on producing units of the highest possible quality, the company pursues a policy of not allowing a block less than 28 days old to leave the yard unless it is an autoclaved product; and all units must meet Underwriters Label specifications.

With this progressive approach, it was only natural that the rapid development of prestressing during recent years should draw Mr. Day's attention. Accordingly he made a preliminary survey of such installations at several locations in the country, and followed up his visits by sending the manager of the company's prestress division, Mott L. Pevey, to several installations in Florida for the purpose of comparing the techniques of pre- and post-tensioning.

Following the decision to construct a pre-tensioning installation, a large part of the technical data concerning construction and operation of pre-casting, pre-tensioning beds was obtained from Lakeland Engineering Associates, Inc., Lakeland, Fla. Con-

The heavy concrete anchorage and jacking base for the 200-ton jack (seen between the threaded pulling rods) on one of the double Tee beds.



A view of the anchorage and fixed framework at the "dead" end of one of the beds.

Continues Diversification

First Prestressing Beds in State Installed by Mississippi Operator

Mott L. Pevey, left, manager of Jackson's prestress division, and Bob Day, yard engineer.

siderable assistance was also rendered by the Prestressed Concrete Institute, and John A. Roebling's Sons Corporation, according to Mr. Day.

With as much information as possible compiled on the type of operation decided upon, a company crew started construction in June, 1955, on a 6- by 400-ft. double Tee casting bed. A portion of the plant property that had been filled with drum washout from the ready-mix trucks was prepared for the casting area. It was selected for its convenient access to the ready-mix plant and also because it provided a suitable storage area for the slabs in the vicinity of the beds.

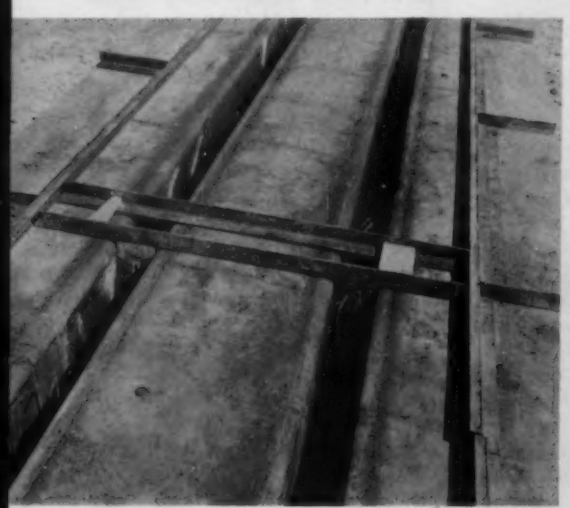
Constructed of reinforced concrete, the bed has a depth of 4 ft. 9 in. at each end and 3 ft. in the middle section; its base is set about 1 foot below grade. A 2½-in. pipe set on each side of the Tee channel liners, along with supply, header, and return lines, make up the hot water system for accelerated curing of cast members. These lines, placed before concrete was poured, are actually two 4-line circuits, each covering about 200 ft. of the length of the bed. An electrical conduit was installed on one side of the bed, and outlets at intervals along the conduit provide a convenient source of power for the vibrators and screeds.

The company crew completed construction of the first bed and placed it in operation in August. A local contractor was then hired to install an identical unit, which went into production in December. Both beds are used to make the company's Jax-Flor or Jax-Dek double Tee floor and roof members. These have a 2-in. depth of slab with a maximum Tee depth of 14 in., maximum slab width of 4 ft., and clear span lengths from 8 to 38 ft. (floor slabs) and 8 to 44 ft. (roof members). The foregoing spans are of standard, parallel strand design. By using sloping strands, *i.e.*, depressing them in the center, much longer spans are obtained with the same members; and one double-Tee bed has been prepared for production of such members.

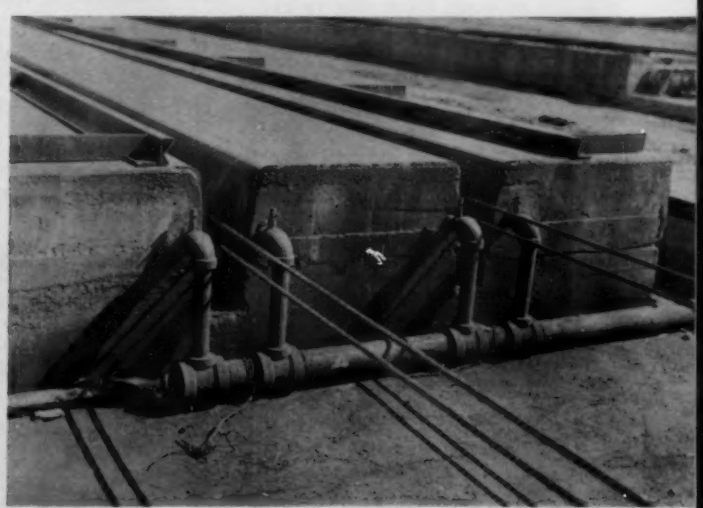
The Tee liners, filler channels, headers, and side forms of the beds were acquired from the Food Machinery and Chemical Corporation, Lakeland, Fla., whose Florida division developed this forming system. Headers for both the jacking and dead ends of the beds were fabricated in the company's own shops.

A heavy reinforced concrete anchorage was constructed at each end of both beds. At the stressing end this anchorage provides a jacking base, and support for the threaded pulling rods and structural steel framework to which one end of each tensioning strand is held by a strand vise. The opposite anchorage supports the rods and framework that

The slotted extensions on each side of the forms seen here allow positioning to provide slab widths up to the maximum of 4 ft.



Part of the hot water piping system in which a 2½-in. pipe was installed on both sides of each Tee to aid accelerated curing when this is desired.



Reels of the ⅜-in. diameter, 7-wire strand used in prestressing are mounted on a rack and the strand is played out to either bed. Strands are pulled into position by a truck.

A closeup of the components of a strand vise, which holds against a 14,000-lb. pull.

accommodate the strand vises of this "dead" or fixed end.

Since available threaded rods lacked the 300,000 p.s.i. tensile strength which the company engineers desired, it was necessary to obtain 1¾-in. plain rods from Meridian Steel Company and have them milled with a standard acre thread. At the stressing end of the beds, these rods, in pairs, are held in position in each of two vertical steel members by lock nuts. The steel uprights are in turn connected by a reinforced horizontal H-beam to which the jacking force is applied during stressing. The beam and uprights are supported on a dolly that carries their weight as the jacking mechanism is operated.

The hydraulic jacks installed are Rodgers Hydraulic Inc. 200-ton capacity units. The ⅜-in., 7-wire strand used in the pre-tensioning is acquired from John A. Roebling's Sons. Four reels of this strand — which is so tough it can only be cut with a torch — are mounted on a tubular steel rack from which the strand is run out to either bed.

In operation, the time required to set up forms is determined by the length of the roof or floor members to be produced. With the longer forms it is possible for the crew to set up and pour on the same day, about one-half of the shift being required for each operation. Setting up shorter forms over the full length of the bed requires nearly the full shift. Slotted members welded at 90 degrees to the outer side of the forms allow the latter to be positioned to provide a maximum form width of 4 ft. Bolts entering the casting bed through the slots are then tightened to lock the form in place. Form setting is usually done from the dead end, due to the fact that the cables spanning the distance between the last form and the jacking mechanism may then have their tension relieved by the jack itself at the end of the curing cycle. This precludes having to cut tensioned cables between the first form and the dead anchorage.

Since the Tee channels are tapered in cross section with the narrower dimension toward the bottom, channel fillers of varying widths can be installed to provide Tee depths ranging from 4 to 14 in. by 2 in. steps.

With the channel fillers placed, the tensioning strands are strung between the stressing and fixed end anchorages. From one to five strands per Tee are used, depending on the depth of the Tee and the span of the member. Preliminary tension is put on each strand by means of a come-along and Havens grip. With nominal tension established on all strands and the form setup complete, the final tensioning is done.

Following strand tensioning, headers are installed and provision is made for any cutouts, cutbacks, or other special opening in the slab which the customer desires. After shielding the cables, the forms are oiled with Shell or Standard form oil which is applied with a garden-type hand sprayer.

Subsequent to placing the concrete, side plates allowing for a welded bond between members at installation on the job, and ⅛-in. Wickwire mesh with 6-in. spacing for slab reinforcing are put in place. Lifting hooks are also set before casting the members, as well as stirrups which are allowed to project from the surface of floor slabs but which are covered in the roof members.

The strands, which have a 20,000-lb. breaking strength, are put under a 14,000-lb. tension which provides a stress of 150,000 p.s.i. by jacking the H-beam at the stressing end to the limit of a pre-calculated lineal measurement. An elongation of 31⅝ in. in the strands gives the desired tension, which is determined by placing a gauge of that length between the jacking anchorage and the H-beam.

Steel case strand vises, made by Reliable Electric are used to clamp the strands at each end for tensioning. As can be seen in the accompanying closeup, these vises consist of a steel cylinder (which has an inner taper), three tapered clamping segments with inner concave surfaces "toothed", and positioning washers and spring. Clamping action results from increasing constriction as the strand, when pulled, draws the three segments against the inner taper of the cylinder. Despite the magnitude of force exerted by the vise against a 14,000-lb. pull, the cylinder, which is lined with a small piece of wax paper prior to being placed on a strand, can be removed later with a relatively light blow. Experience in operation thus far has been that these vises may be used on an average of five times.

The beds are then ready for the pour, for which the company's own ready-mix trucks are employed. Since the beds are so situated that the trucks can be driven along either side of both, the pour can be made from either direction. The ready-mix trucks are loaded at the adjacent central mixing plant with a special mix in which the pea gravel contained has a maximum size of ⅝ in. Cement content has been calculated

to provide a minimum high-early strength of 5,000 p.s.i. in 28 days. Average production, in which the full length of a bed is utilized, takes approximately 19 cu. yd. of ready-mix.

As the pour proceeds, the crew follows the truck with stem and screed vibrators. A Mall, 1¼-in. head vibrator is used for the former, while a Syntron form vibrator mounted on a channel is employed as a screed. Final finishing is done with a wood float.

While the average curing cycle covers a period of 26 hours, the hot water piping system, previously described, can be put into operation to accelerate curing. In order to avoid a flash set of the layer of concrete in contact with the channel and bed surfaces, the boiler, when used, is fired up after the pour, and water circulation in the piping system is started at the same time as the boiler to allow the water to heat gradually. A Sellers 2,000,000-B.t.u. boiler using natural gas as fuel supplies both pre-tensioning beds with water at a temperature of 180 to 190 deg. F. This maintains a curing temperature in the members of approximately 160 to 170 deg. F.

Following the curing cycle jacking pressure is released and strand tension is relieved, thus transferring a compression prestress to the slabs. Forms are loosened and stripped, and the strands between form headers are cut with a torch. A P&H 255A LC yard crane then picks up the slabs and transfers them to the storage area, where they are stacked. Subsequent to stacking, the short strand end projecting from the ends of the Tees are burned off and the area is grouted. After a day the members are ready for loading and shipment on flatbed trucks or rail flatcars. Loading is accomplished with the yard crane.

No stockpiling of roof and floor slabs is done since all members are made to fill specific orders. In addition to these units, which are manufactured under P.C.I. specifications, the company is prepared to produce precast beams and other comparable structural units. A 4- by 400-ft. flat bed was also installed for these operations.

At present prestressed piling is under initial production for a Mississippi State Highway bridge project. These piling are 16 by 16 in., solid, with a length of approximately 50 to 55 ft. The 4- by 400-ft. bed has been set up to accommodate production of two lines of piling simultaneously, providing, in effect, 800 lineal feet of bed on each pour.

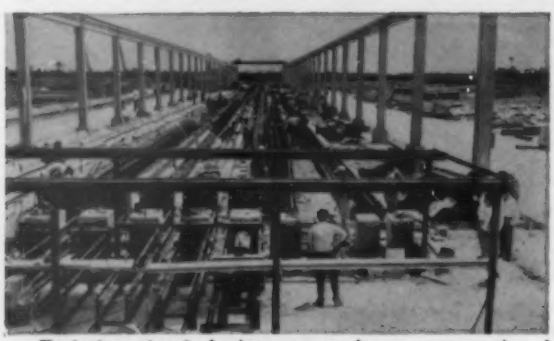
Along with the construction of the three casting beds, an adjacent concrete block shop and supply building was erected. The latter houses the boiler, the pump for the jacking equipment, standard shop welding equipment, and a steel inventory.

Operation of the pre-tensioning installation is carried out on one shift with a 5-man crew under the direction of J. J. Lilley, superintendent. Mott L. Pevey, a World War II Air Force pilot who is an engineering graduate of Mississippi State, and who also taught there for three years before working as a consulting engineer, was brought into the Jackson Ready Mix organization by Mr. Day to organize and manage the prestress division. Bob Day, another Mississippi State engineer, who recently joined the firm as yard engineer, has also played a part in the development of the new operation.

Pouring operations can be conducted from either end of the beds. Stem and screed vibration is followed by a final wood float finish.

A view of flatcar loading operations on a spur near the casting and storage area.

New thirteen-year, multi-billion
OPENS VAST NEW MARKET FOR



Typical casting bed where structurals are prestressed and cast. The operation is continuous and turns out prefabricated structural members in hours instead of weeks.

"Big" takes on a new dimension when applied to the National Highway Program. 40,000 miles of roads. 500,000 jobs. 32½ billion dollars. And about 300,000 new bridges, most of which can be built much faster and more economically with prestressed concrete than with any competitive building material.

It's history's biggest order for bridges. A giant demand for present makers of prestressed concrete. And a tremendous opportunity for those who decide to go into the business now.

For prestressed concrete construction answers this bridge need as nothing else can. In high degree of strength and permanence. Speed of construction. Savings in time and money. More profit for suppliers and constructors—greater value for taxpayers.

Bridges and highway slabs are just two of many uses where concrete prestressed with Union Tufwire

Prestressed beams ready for transportation by truck, rail or barge. The size of prestressed concrete members which can be cast in permanent site beds is limited only by transportation facilities and regulations. In on-site operations, prestressed girder spans up to 312 feet have been cast.

Hoisting a long beam for quick setting in position. Speed of construction is one of many prestressed concrete advantages. Time saved is money saved—and after construction there are further economies in maintenance.

dollar highway program
PRESTRESSED CONCRETE MAKERS

strand and wire is proving its structural and economic advantages. Others range from fence posts to complete buildings and warehouses. Almost anything that concrete will do—it will do better when prestressed with Union Tufwire.

UNION Tufwire...
Tendon of Strength in Prestressed Concrete

Union Wire Rope Corporation is geared to the needs of the vast national highway program. Just as we've kept in step with the seven-league strides of prestressed concrete construction since the trend shaped up ten years ago.

Union Tufwire strand and wire is being supplied with on-schedule efficiency to such jobs as the Lake Pontchartrain causeway (longest highway bridge in the world; pretensioned with 3,700 tons of Tufwire strand.) Tufwire is being delivered just as promptly to a rapidly growing list of other customers, large and small. Our expanding plant capacity and Mid-America location assure you that sort of service—today and in the future.

If you're now in the business of making prestressed concrete let our engineering department and research laboratory give you and your consulting engineers a lift with any prestressing problem.

If you're among those who see the big opportunity opening up for new makers of prestressed concrete, let us help you explore the possibilities. It may well be the most important decision you ever made!

union Wire Rope corporation

Specialists in high carbon wire, wire rope, braided wire fabric, stress-relieved wire and strand
2304 Manchester Avenue, Kansas City 26, Missouri

Finished section of the 24-mile bridge which is spanning Lake Pontchartrain (near New Orleans) in record time. Each slab in this colossal causeway is reinforced with 175 Union Tufwire strands.

Central casting yard of Rockwin Prestressed Concrete Corporation, Norwalk, Calif. In the foreground are some of the heavy-duty double-Tee floor slabs, workmen building custom plywood formwork, and the No. 1 casting bed.

Rockwin Prestressed

By HARRY F. UTLEY

A track-mounted cable-reel car which can feed prestressing strands to any of the six casting beds.

Ten strands of prestressing cable being positioned in one of the Form-Crete beds (5 strands per stem). After these strands are tensioned, the form will be ready for concrete.

Another ON THE SPOT Report

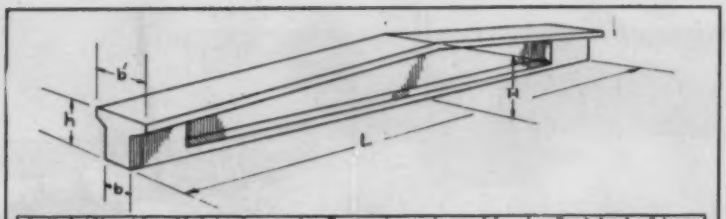
ROCKWIN Prestressed Concrete Corporation, with headquarters in Beverly Hills and a central casting plant near Norwalk, Calif., has had an astonishing growth within the space of a single year. The company name was coined from the first syllables, in reverse, of its board chairman, Winthrop Rockefeller. It is engaged in the large-scale manufacture of precast, pretensioned roof and floor slabs, beams, columns, wall sections, piling, and bridge elements.

In the summer of 1955, on a 5-acre tract near Norwalk, the concern laid down its first prestressing bed. Now, a year later, it has six casting beds, ranging in length from 405 to 420 ft. in steady production. Two of these are double units 15 ft. wide, permitting the pouring of two types of structural members simultaneously, and giving the plant the productive effectiveness of eight beds.

In the spring of 1956, as part of its long-range planning for still greater expansion, the corporation acquired additional adjoining land which will nearly triple its present plant area. A staff of approximately 40 engineers and technicians is housed in a separate building in nearby Norwalk. Its backlog of orders continues to grow. Current major contracts include the new May Company department store near Covina, the General Electric building, and new structures at Disneyland.

Recently installed at the Rockwin yard were two parallel 420-ft. Form-Crete double-Tee casting beds. These standardized steel form lines, a product of the Florida Division of Food Machinery & Chemical Corporation, are being utilized largely to supply the ever-growing demand for pretensioned roof slabs. The forms,

California firm's phenomenal growth within one year justifies plans for expansion



Span feet	Allowable added load	H	h	b	b'	Dead load of beam Pounds
		------ inches -------				
50	440 - 600	35½	14	10½	14	8100
55	440 - 550	37½	14	10½	14	9200
60	440 - 550	39	14	10½	14	10300
65	440	41	14	10½	14	11600
65	550	41	14	11	14½	12100

Rockwin tapered prestressed concrete roof beams represent a new form of roof slab typical of Western prestressing practice.

manufactured and shipped in 30-ft. sections, are assembled with bolts. Slots in the lower mountings permit longitudinal expansion when the heat of curing is transmitted.

The Rockwin yard is equipped with its own dry-batching plant, and the mixing and placing of the low-slump concrete is done with a Rex paver which travels along the bed lines after the prestressing strands have been tensioned in the forms by hydraulic jacks. Rocklite expanded-shale coarse aggregate and a blend of Rocklite fines and natural sands are employed to a large extent in the mixes. High-early-strength cement (used exclusively) is received in bulk by truck-trailers from the Victorville plant of the Southwestern Portland Cement Company.

Curing, an 18-hr. cycle, is done with live steam supplied by a 55-hp. boiler. Recent expansion has called for increased curing capacity, and the company is installing another boiler this summer.

The reels of Roebling 7/16-in. 7-wire stress-relieved strands are carried on a company-designed 10-reel rail-mounted carriage which travels at right angles to the beds between the end abutments, making it convenient to feed the strands into any of the casting bed forms for correct positioning and prestressing.

Particular attention is currently being focussed on camber control, especially on the heavier double-Tee floor slabs which are cast on the No. 1 bed. The vertical profile of the pre-tensioning strands is controlled at any point along the bed by harping. This bed was designed for a total pre-tensioning force of 1,000,000 lb.

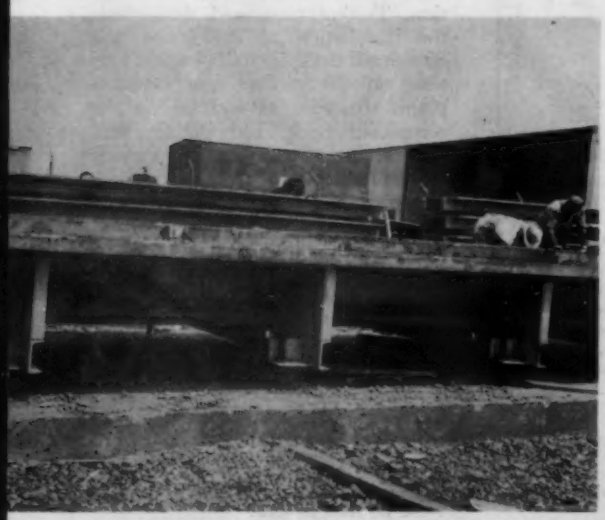
Rockwin casts both standard and custom-designed pre-tensioned structural elements. Standard sections are, of course, the most economical in use since the investment in forms, anchorage plates, etc., is amortized over many jobs. On demand, special plywood forms are designed and constructed and the members are fabricated at the Norwalk plant under controlled conditions more economically than could be done at the job site. If desired, post-tensioning of members is also available.

In the southern California area, where construction activity continues to pace the nation, the Rockwin organization was quick to grasp the ready-made opportunity to supply prestressed members for any structural application. Its rapid growth and planned expansion in this field has outpaced any serious attempt to compete for the available business.

Much has been published in recent issues of this magazine on the

(*Continued on page* 272)

A closeup of a portion of one of the double-Tee form sections, showing supporting and leveling bolts and the steam-curing line below.



Jacking ends of the two Form-Crete double-Tee prestressing beds, with a hydraulic pump and motor in the foreground.

The casting bed at Prestressed Concrete Structures, Inc., Frankfort, Ill., showing the general layout of the bed and sidewalls. Stressing equipment is housed at the far end of the bed.

First Illinois Toll Road Bridge Puts Prestressed Concrete to Test

By ROY L. PECK

Another ON THE SPOT Report

SOME of the longest pretensioned prestressed concrete bridge stringers yet used were delivered and set in place a few weeks ago on the first cross-over spanning the new Illinois Toll Road, near Elgin, Ill. They had been manufactured at a plant considered the first of its type in the Chicago area to make prestressed concrete structural members. The bridge is the first of some 200 similar structures which will be required for the cross-overs on the new 195-mile system of highways to be constructed in the state.

Whether these structures will be built of prestressed concrete or of other materials depends mainly upon tests now being completed on the new bridge, and on other considerations affecting the choice. The concrete industry—particularly the prestressed component thereof — looks with interest to the answer, in view of the great progress made in the use of prestressed concrete for many types of such structures over the last five years.

Corollary to the tests of fitness are the savings which might conceivably accrue to taxpayers if prestressed members are chosen. Possible savings have been estimated by George Jackson, chief engineer of the toll road commission, to be approximately $25,000 per bridge, which would amount to total savings of $5,000,000 if such construction were to be used throughout the program.

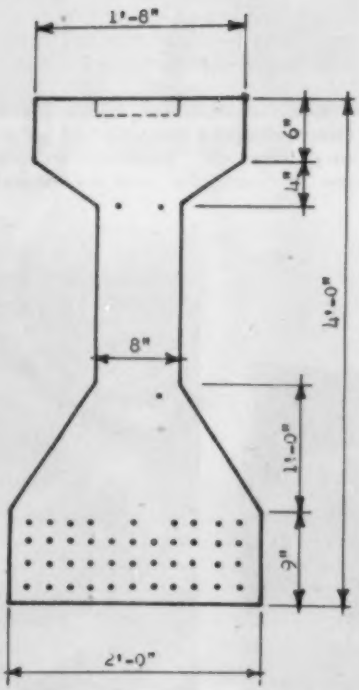


Fig. 1. Cross-section of the typical 70-ft. 5-in. beam, which had 46 strands.

Mr. Jackson also declared it his belief that the construction in prestressed concrete could be completed in one-fourth of the time it would take to install structural steel bridge spans. The recent steel strike, with consequent higher prices for steel fabrication, did not enhance the situation as regards the possible use of structural steel.

The near-record-size girders used in the framing of the bridge for both approach and main spans, as shown in the accompanying drawings, were cast in the prestressing bed of Prestressed Concrete Structures, Inc., located at Frankfort, Ill., 35 miles southwest of Chicago, and 50 miles by road from the job site. Approach span stringers are 42 ft. 10 in. long and the main spans 70 ft. 5 in. in length. Other pertinent dimensions and details of the beams are shown on the drawings. Weighing 17 and 27½ tons, respectively, they were hauled to the job site *via* motor truck with separate front and rear support axles, as shown.

The girders were placed as indicated on the drawings, and prestressed concrete slabs 2½ in. thick formed the area between the girders. After the frame was in place, a 5-in.-thick poured-in-place concrete slab completed the bridge deck floor section. Testing continued throughout the installation of the frame and completed deck, including static load tests on the girders and concrete plank structure as well as on the completed deck, and impact load tests on the latter. All tests were made in accordance with the specifications of the Illinois State Toll Road Commission, on the basis of the design of the bridge, made by Joseph K. Konerle and Associates, Chicago, consulting engineers for the commission. Details of these tests will be presented in a future issue of the CONCRETE MANUFACTURER.

Prestressed concrete piling used on the test bridge was brought by rail from the Raymond Concrete Pile Company plant at New Orleans, La. Concrete cross bents on the piling were poured *in situ*.

The Frankfort prestressing plant making the test bridge members was designed by Arnold S. Rosner, of Max Rosner, C.E., & Associates, Chicago consulting engineers. Special features in this plant include such innovations as the following:

1. Pre-tensioning equipment capable of stressing well over 1,000,000 lb. at a single pull.

2. Prestress capacity of over 5,000,000 lb.

3. A radiant heating system which has permitted placing concrete in weather at—15 deg. F. temperature.

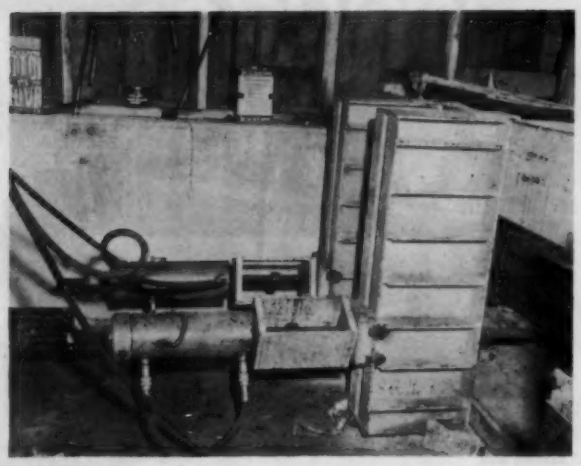
4. A rapid curing system achieving 4,000 p.s.i. concrete in 14 hours, even during sub-zero periods that would have stopped production in most plants.

5. Complete testing facilities for concrete cylinders and reinforcing, and full-scale tests of structural members to failure. This equipment includes electronic load cells, SR-4 strain gauges, Whittemore gauges, and almost as varied equipment as that in commercial laboratories.

The first prestressing job which the company had required delivery in February, 1955, which meant that the casting work would have to be done in winter. A brief cost comparison showed that constructing a building to cover the casting bed was out of the question so far as cost and time were concerned. It was found that a radiant heating system could be added to an outdoor bed for an additional cost of only $2,100 and that this would keep the surface temperature at 120 deg. F., even in an air temperature of —10 deg. F.

The subsequent history of the company's operations over the next year shows that ten prestressing jobs were completed. These include the following, in addition to the Toll Road bridge job: An 80,000-sq. ft. one-story industrial building, located 140 miles from the plant, in which the concrete frame, using a full moment connection at all columns, was erected in 12 working days at a cost of about $8.80 per ton; a bakery job of prestressed columns, beams, and 4-ft.-wide channel slabs spanning 51 ft.; apartments, schools, residences, other bridge jobs, and considerable research work on experimental and composite slabs. The products furnished included beams, girders, lintels, slabs, columns, concrete plank, and channel slabs.

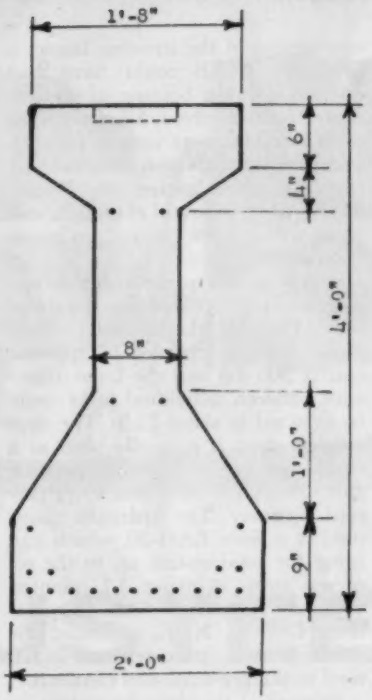
The test bridge job, according to Mr. Rosner, provided a good example of the techniques which must be devised to solve problems as these occur. Pre-tensioning there called for a 1,030,000-lb. pull. The force contract with the state commission allowed only a term of 45 days, subject to a penalty of $500 per day, to set up equipment, build forms, produce and deliver the 24 girders and the approximately 5,800 sq. ft. of 6- by 9-ft., 2½-in.-thick concrete slabs for the decking area.



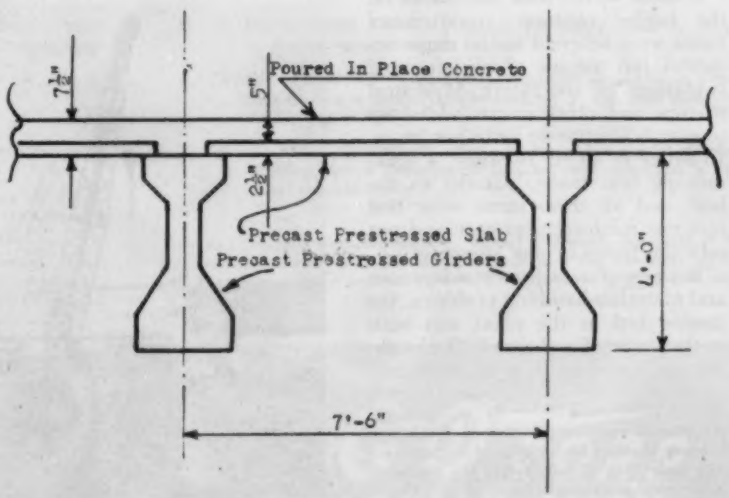
Two of the eight 60-ton center hole hydraulic pullers used in the prestressing operation on the girders.

For stressing, the standard unit used in the plant is a 60-ton Simplex-Jenny center-hole hydraulic puller, made by Templeton, Kenly & Company, Broadview, Ill. When more than three units are combined for a single pull, a problem exists similar to that of a table with a short leg. While this method has inherent problems—as does any system—its extreme flexibility has made possible the same components for all products made at the plant so far.

Balance and equal stress must be maintained in all jacks to prevent



Right: Fig. 2. Cross-section of the typical 42-ft. 10-in. beam, which had 21 strands.



Below: Fig. 3. Transverse cross-section of a section of the bridge deck, showing positioning of the longitudinal girders and prestressed slabs.

A crane raising one of the 70-ft. 5-in. beams out of the forms at the casting bed.

A view at the casting site, showing a crane loading of a 70-ft. 5-in. beam onto the hauling truck supports used for delivery to the job site.

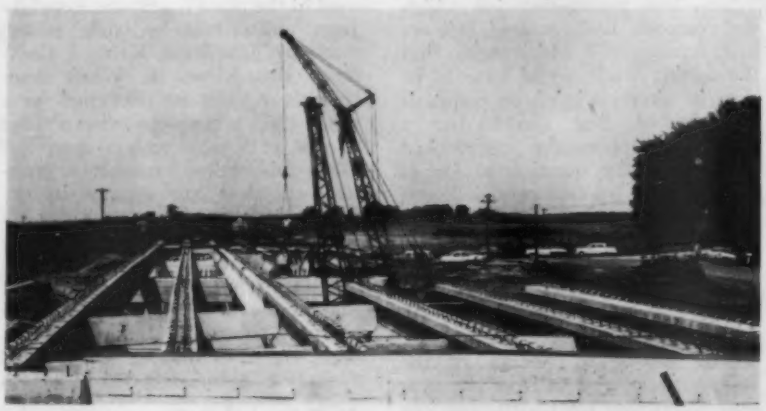
overturning of the stressing frame, a possibility which could have had disastrous results because of the size of the forces involved. All of the eight jacks available were used in parallel, and with this arrangement came the problem of balancing an "eight-legged table". Careful alignment and proof-testing were "musts", to insure good results.

A special electronic load cell was built and incorporated into the stressing system for this contract. Total force could be checked to approximately 500 lb., and the force difference between individual jacks could be detected to about 25 lb. The electronic system is normally used as a check against the hydraulic pressure gauge, which is calibrated to ½ percent accuracy. The hydraulic gauge used is a Seco LAH-20, which can bring the total system up to the required stress in about 3.1 minutes. John A. Roebling's Sons Corporation, Trenton, N. J., furnished the 7-wire 7/16-in. stress-relieved strand used in the pre-tensioned elements.

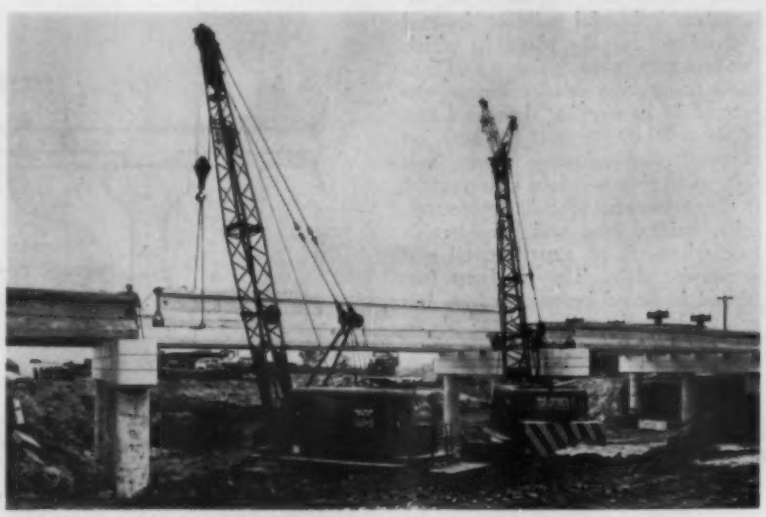
Because of the time limitations on the bridge contract, wood panel forms were adapted to the shape required, but the use of steel forming is planned for the future. Mild steel stirrups and other inserts added up to over 400 separate items per beam. In order to speed assembly, a separate jig was made, parallel to the bed, and all these items were tied into one reinforcement cage and put into the forms in one assembly.

Because of weather considerations and materials-handling problems, the casting bed at the plant was built in the shape of a channel. The working surface is 12 ft. 6 in. wide and the side walls are 2 ft. 6 in. high by 1 ft. thick. The walls rise 1 ft. above the ground surface, and are designed to receive gantry crane rails later on. A gantry crane was designed to straddle the bed and to be used for placing concrete and handling finished members. Adjustable working lengths are made possible by installing a series of notches in the floor and walls of the bed. When necessary, the bed can be lengthened by adding bed length.

(*Continued on page* 273)



Cranes setting one of the 12 main span prestressed girders in place. The piles were also prestressed, and pile cross bents were poured at the site.



An overall construction view of the bridge framing, showing the location of the approach and main span girders before the transverse deck slabs were placed.

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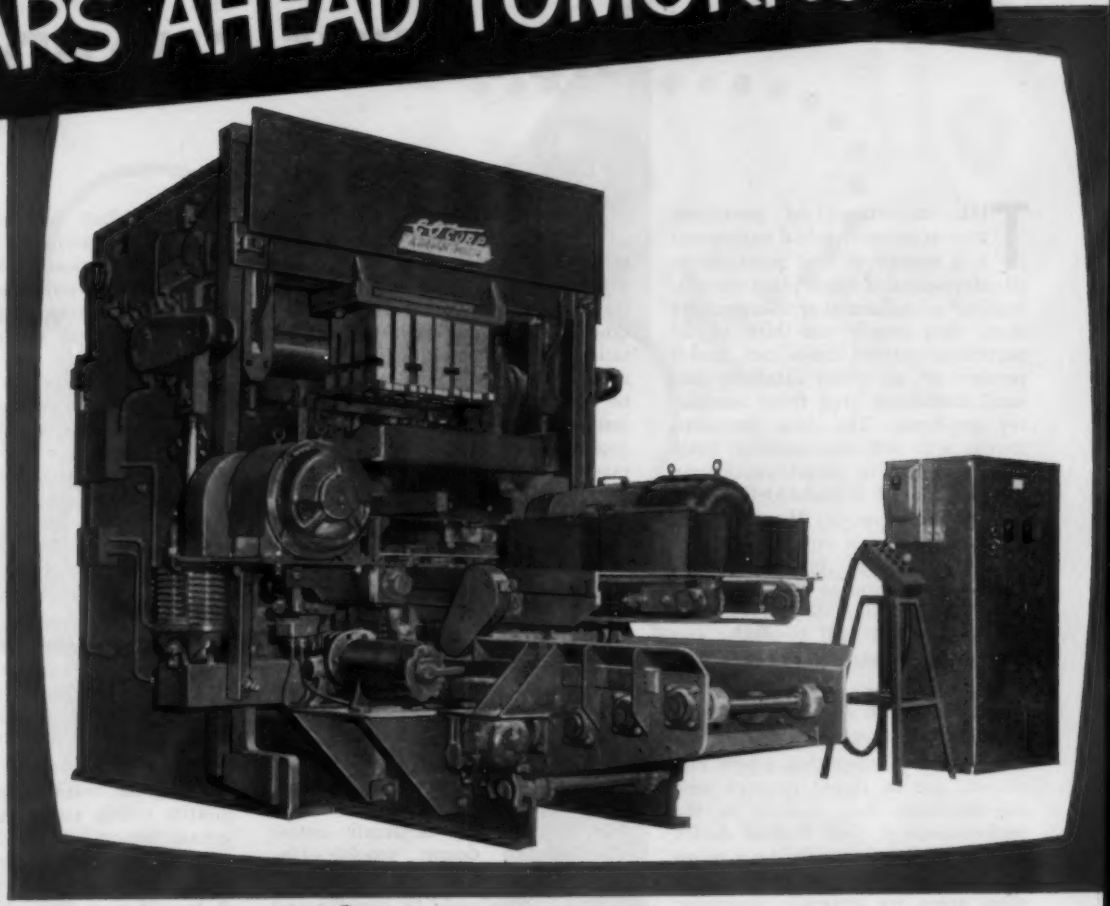

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Principles of

MACHINE GUARDING

THE importance of providing guards on mechanical equipment is a matter of first principle to all safety-minded block plant owners. Studies* of industrial accident causes show that nearly one-third of all permanent-partial disabilities, and 9 percent of all plant fatalities and total disabilities arise from machinery accidents. The data contained herein will aid the concrete block plant foreman or maintenance man assigned the job of constructing suitable machine guards. However, it is recommended that equipment when purchased should have as much built-in protection as possible. Such protection is preferable to shop-made guards, since it will generally cost less and be of better design.

There are two types of hazards which should be guarded against in a concrete block plant:

1. Areas of operation where employees are in direct contact with the machines they operate in the performance of their routine duties, such as off-bearing, running a mixer machine, etc. Injuries occurring in these areas are generally associated with the operation of the machine —an operator reaches into an unguarded concrete mixer for a hand sample and has his hand crushed by the mixer blade.

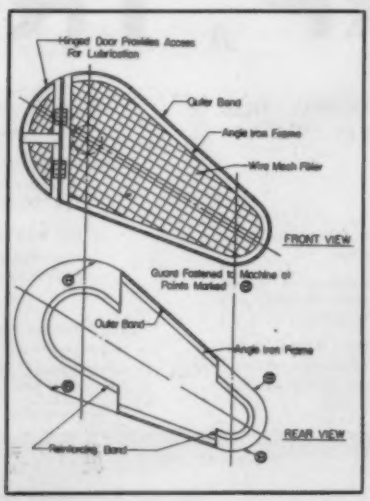
2. Points of power transmission, where a source of power is transferred from one machine location to another, such as the belt drive on a concrete mixer, the drive wheel on a block machine, etc. Unguarded, this type of hazard is particularly dangerous to everyone working in its vicinity. However, it is fairly easy to guard, since access to it may be minimized to routine maintenance and repair. Plant accidents involving unguarded power transmission points may result from such an everyday happening as an employee slipping or tripping and falling against the moving parts of a machine.

The following recommendations for guard design and construction apply to both of the above types of hazard:

1. Once installed, a guard should become a permanent part of the machine to which it is attached. It should never be removed from the machine unless the machine is shut down for repair or adjustment, and unless proper precautionary measures are taken to insure that it will not be accidentally turned on. In some instances it is possible to design guards that are interlocked with the machine, so that the machine cannot be operated unless the guard is in place. Where this type of installation is impracticable, employees must be told not to operate unguarded machines, and it then becomes a matter of enforcing safety rules.

2. A safety guard should not interfere with the operation of the machine or cause discomfort to the operator. This requires that each guard be designed for a specific hazard; and it is one reason why it is always desirable to purchase new equipment, with guards installed. The manufacturer is usually better qualified to design trouble-free guards.

3. Guards should be durable and resistant to fire, corrosion, etc. They should be strong enough in themselves to resist the shock and wear to which they will be subjected. Metal is the preferred material for guard construction. The framework may be made from structural shapes (steel angles, straps, and channels), pipe or rod stock. Filler material, or protective cover, may be of expanded, perforated or solid sheet metal or of heavy wire mesh. A typical machine guard is illustrated in the accompanying illustration. Guards constructed of wood lack the strength and durability of metal and require greater maintenance. Except for a few locations, such as guard rails on steps and balconies, their use is not recommended.



One type of protective guard for power transmission equipment.

4. Well-designed machine guards should not present hazards such as splinters, pinch points, sharp corners, rough edges, burrs, or other sources of injury to the personnel working around them.

5. Provision should be made for carrying out routine servicing behind guards which cover such items as grease fittings, oil feeds, etc. One method by which this can be accomplished is shown in the illustration. A hinged door has been built in to permit lubrication without guard removal. When the lubricant used is oil, a long-spout gravity flow or forced-feed oilcan will permit the oiler to stand clear while carrying out his job, thus eliminating the need for such a door.

6. The choice between an open (perforated or expanded metal, or wire mesh) or closed (solid sheet metal) type of cover material depends upon the location of the equipment and upon maintenance needs. Complete enclosure by a guard affords protection to the equipment from weather or dust, while "open" covers allow easier inspection and servicing. When the latter type of cover is used, consideration must be given to the maximum size of opening that can be safely employed. For small guards (up to 3 ft.) openings of ½ in. are sufficiently safe. On larger sizes the maximum safe opening depends upon the distance between the guard and the danger zone, and may be calculated by the following equation:

*Accident Facts, National Safety Council Publication.

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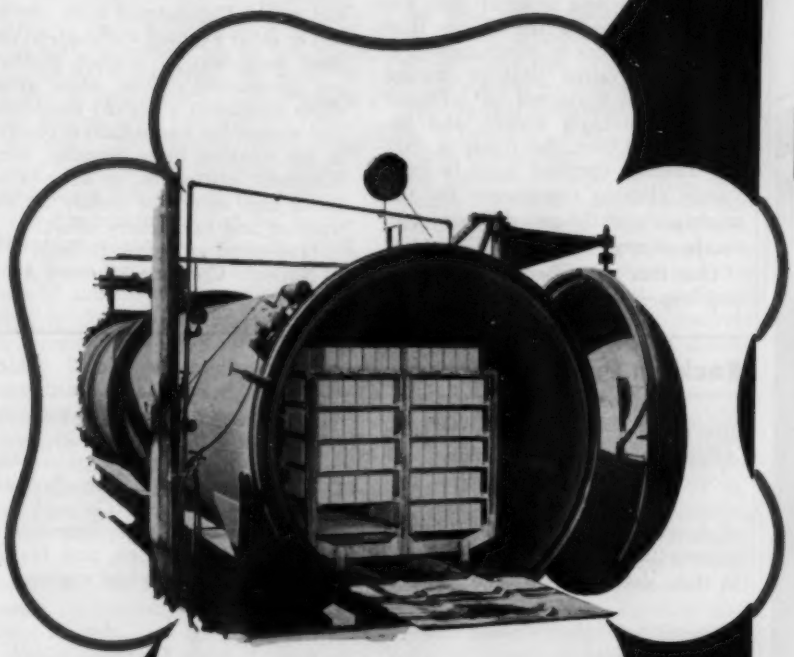

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GASOLINE PLANTS

Start now to insure your future business with McNamar autoclaves.

Pictured above is one of four units purchased by Arkhola Sand and Gravel Company in Ft. Smith, Arkansas.

By dealing directly with McNamar, you can purchase a complete prefabricated plant. These units are backed by unexcelled fabricating ability and 17 years experience in the field.

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RUBBER EXTRUSION

- No Cutting or Sawing.
- No Need for Special Blocks.
- Use with Any Standard Metal Sash Block.
- No Building Paper or Mortar Filling Needed.

BLOK-JOINT'S "cross-shaped" rubber extrusion design simplifies construction of masonry wall control joints. Use BLOK-JOINT with **any standard metal sash block!**

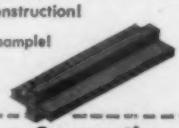
"100 Year Life" rubber assures maximum effectiveness for the lifetime of the building. BLOK-JOINT forms a secure interlock, actually adds stability to the wall.

Use BLOK-JOINT for all types of masonry wall construction!—Block walls, brick veneer over blocks, cavity walls and many other types!

Simplicity, Versatility and maximum effectiveness are yours with Carter-Waters BLOK-JOINT.

NOW! See For Yourself how BLOK-JOINT fits masonry wall construction!

Write Today for FREE sample! Use this coupon.



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2440 Pennway Kansas City 8, Mo.

Please send me a FREE sample and specifications on the new Carter-Waters BLOK-JOINT.

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KANSAS CITY MISSOURI

2440 Pennway Phone GRand 1-2370

Maximum safe opening = ¼ in. + distance of guard from danger zone / 8

In no case should an opening greater than 2 in. be permitted.

7. Guards should be inspected and repaired with the same regularity as the machine to which they are attached. One of the things that causes employees to reject guards is the too prevalent practice among maintenance personnel of allowing guards to remain broken and inadequate. Often the result is that the machine operator must be constantly alert to compensate for the inadequacy of the guard, in order to escape injury.

One fact alone justifies the effort and expense invested to achieve a sound, thorough program to control mechanical exposure (The total number of employee-hours worked by all employees in the environment of mechanical equipment), and that fact is that *guards always result in a positive permanent gain.* Elimination of a mechanical hazard by installing a guard always pays for itself and more. Dependence upon operators or other exposed workmen to use good judgment is neither positive nor permanent. Even after great effort establishes a healthy awareness and respect for mechanical exposures in the working force, impulse, snap judgment, distraction, or some other factor can reduce or nullify all the training and supervisory effort.

(Presented as Safety Bulletin No. 9, National Concrete Masonry Association.)

Rockwin Prestressed

(*From page* 265)

growth of prestressed concrete as an industry, the various techniques employed, the improvement in prestressing steels, and the simplification of design calculations. The Rockwin organization is continually "on top" in these developments; and the firm contributed many "firsts" which have quickly become standard practices in what must still be regarded as an infant industry.

Morris E. Pynoos is president and general manager of the Rockwin Prestressed Concrete Corp. Frank M. Christiansen is superintendent of the Norwalk operation, and Harold S. Dewdney is the chief engineer.

Left: The paver machine and the batch plant (background) for preparation and placing of high-early-strength, low-slump concrete.

Right: Plywood form for special order bridge girder, with 24 pre-tensioned strands in position preparatory to placing concrete.

Illinois Toll Road Bridge

(*From page* 268)

The radiant heating system is fed by a 100-hp. Kewanee Scotch marine low-pressure boiler. Because of this heating system only 8 or 10 working days have been lost in the last year. Only a direct driving rain or a blizzard can stop work. High-early-strength cement, used in the ratio of 7½ sacks of cement per cu. yd., produced 5,000-p.s.i. concrete with 24 hours of steam curing, after which the strands were cut and the forms removed. The concrete plank slabs were prestressed in the long dimension, using Roebling ¼-in. strands.

In the present casting bed at the Frankfort plant the following products have been fabricated over the last 18 months: 4-ft. wide channel slab, in depths of from 4 in. to 18 in., used for floor slabs and roof decks; square rectangular columns, rectangular beams, joists, and I-beams fabricated for industrial and commercial building; I-beams, prestressed plank, and, hollow box beams for bridges. I-beams have been built up to 4-ft. depth and 71-ft. lengths for the test bridge contract.

Mr. Rosner is of the opinion that prestressing need not be limited to the very large operation. He has proved his contention on the many smaller contracts which the Frankfort plant has successfully completed. He feels that such work can be done on a moderate scale. In the early stages development work is heavy and somewhat costly, until a satisfactory product and production method is achieved. Once achieved, with proper quality control and with trained personnel, prestressing, in his opinion, can become a profitable operation to any successful concrete producer of either ready-mixed concrete or concrete blocks.

Traveling U. S. Industrialist Describes European Plants

The following letter was received from George F. Goetz, Clifton Concrete & Supply Company, Lakewood, Ohio. Mr. Goetz is touring Europe and visiting concrete plants of different types. We felt that his remarks would be interesting to our readers. Dear Friends:

While visiting Europe, I went to a ready-mixed concrete plant in Rotterdam, Holland. This plant is owned by a cement company, and large contractors are stockholders. It is called the Dutch Concrete Company. There are 33 trucks in two plants, both of which are central-mix, the trucks all being 2-yd. Rex truck mixers. It was a wonderfully clean place, as they have a man who cleans the plant all day long. Coffee is served to the sales and office help throughout the day.

"Truck drivers at these plants are paid 1.54 gulden (62 cents) per hour, and they work 8 to 10 hours daily. After 1,000 cu. yd. of concrete is delivered, the whole crew is paid a bonus of 10 gulden ($4.02) per man monthly. Each three months a bonus of 12 gulden ($4.82) is paid a driver who has had no accidents for that period. Such safe-driving bonuses amount to 20 gulden ($8.04) annually for some drivers.

"Cement is delivered to the ready-mix plant by barge from the cement plant and is pumped into bins with a Fuller-Kinyon cement pump. Barge delivery is also used for other concrete aggregates. . . . In Holland and Germany all cement is sold through dealers, except that which is delivered direct to construction sites on the Autobahn (national through roads). Cement silos on the jobs each hold about 6 tons of cement, and two types of cement—No. 225 and No. 235—are provided.

"I also visited the largest block plant in Frankfort, Germany. All blocks are made of crushed and graded materials obtained from the ruins of bombed buildings. Two types of crushers are usually used, along with a dozen different sets of wire screens. Lightweight aggregates for blocks are also produced by means of the sintering process. In that plant three block machines turn out six units per cycle, these blocks being 19 in. long, 6 in. high, and 14 in. wide, all air-cured.

"They also have a machine here that pumps concrete by air through a 6-in. diameter pipe up 12 stories in building construction. I shall investigate this machine at the factory. I watched it work and it seems to do a wonderful job. There are no ready-mixed concrete plants in Germany or Austria, and only two in Holland. There is a large field for ready-mix in Europe as there is large-scale construction in the replacement of the buildings which were bombed during the war. In fact, they still have about five years more of work of this nature in the larger cities."

One of the newest business ventures of the Ennis, Tex., area is the Ennis Concrete Pipe and Products Company's new ready-mix plant. Owners of the firm are W. R. Pool and Jesse Price.

For Better Reinforcing With "Deep-Grip" Swedging

BLOK-MESH

MASONRY WALL REINFORCING

- Exclusive Deforming Provides Large, Well Defined "Squared Edges"
- Provides "Sure Lock" Between Reinforcing and Mortar
- Requires No More Area in the Joint Than Superficial Deforming
- As Easy to Handle as Other Types

You can see at a glance the extra "grip-ability" of Carter-Waters BLOK-MESH. The horizontal and vertical surfaces provide a sure lock even under lateral pressure and shrinkage.

BLOK-MESH Minimizes Cracking above lintels, below sills, at corners.

BLOK-MESH Is Best to tie brick to back-up blocks, for cavity wall construction, double walls, ordinary block wall construction.

Remember, BLOK-MESH by Carter-Waters is the only masonry wall reinforcing with the "deep-grip", positive anchor swedging.

SEE The Big Difference In Sweet's File or...

Write Today for your FREE illustrated brochure on the New Carter-Waters Blok-Mesh! Use This Coupon.

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Please send me FREE brochure and specifications on new Carter-Waters BLOK-MESH.

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In the yard the fork lift can load the big trailer in a matter of minutes.

Tow-Along Fork Lifts Expedite Deliveries Of Concrete Block

Another P&O Exclusive

IT IS becoming quite common in the Southwest, in southern California especially, to observe a truck or truck-trailer loaded with concrete blocks en route to a job, towing a fork-lift truck along behind. Scores of block producers and contract haulers have discovered that, upon arriving at the jobsite, the fork lift is a most economical, versatile tool for disposing of the load. The palleted cubes can quickly be set out in the desired sports, ready and convenient for the mason and without the necessity of further re-handling, for the most part.

These highly maneuverable fork lift trucks are able to advance quickly through areas too narrow for the ordinary delivery truck to negotiate. Delivery trucks, heavily loaded, must shun driveways and sidewalks which might break under the weight, while the fork lifts can travel anywhere with their loads, and do. High-lift masts also permit placing of cubes of blocks right on the scaffolds.

Since disposition of the blocks with forklifts eliminates rehandling, by the same token the method has also reduced breakage and corner chipping to the minimum. This feature is so aesthetically important that at least four architects in the Los Angeles area are specifying that all block deliveries be made by this method because better looking masonry walls result!

According to M. M. Simovich, Champ Corp., El Monte, Calif., pioneer designer and builder of forklift trucks especially for this service, the introduction of the forklift to this phase of the industry has doubled the delivery time to practically one-half. At the same time, added savings have gone into the material man's pocket.

Probably as important a factor as any has also been the upgrading of personnel available for the work of delivery. When such handling was done by hand, it was a major problem for employers to find men willing to hire out for this back-breaking work. Today a much higher calibre of worker is available for this mechanized service; and these men are proving more capable of carrying out orders, coping with unexpected conditions, and aiding in the development of improved customer relations.

The use of "bob-tail" trucks for block hauling, with load limits of 5 to 8 tons, has generally given way on the West Coast, to the semi-trailer rig with legal loads of 15 to 20 tons. The former daily average of 3 to 4 loads delivered is still maintained, but with the larger capacity equipment and the forklifts speeding loading and unloading, the number of units delivered is doubled and tripled. At a typical local delivery cost of 2 cents per 8- by 8- by 16-in. unit, this amounts to an increase in earnings of about $37.80 for the minimum 3-load day.

A new tow-along forklift truck, like the "Champion" in the accompanying illustrations, can be purchased on time payments for about $4 per day. Without assuming the cost of the semi-trailer delivery unit, since it would replace a second truck in the line not now required, this figures out to an added gross of $33

Removed from the delivery trailer, the lift truck can maneuver into narrow openings and deliver the block wherever needed. Note the towing attachment.

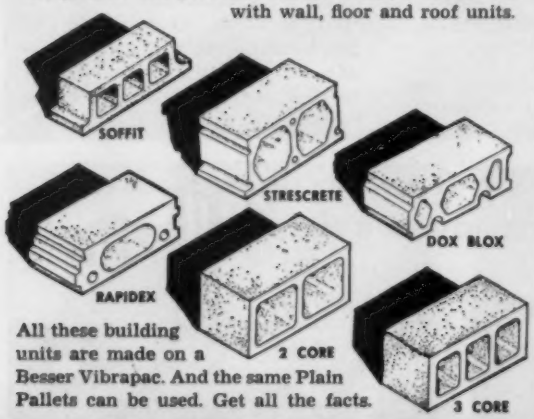
Go After the Entire Market!

Block for WALLS

Block for FLOORS

Block for ROOFS

Fire-safe walls? Of course! But floors and roofs should be fire-safe, too. Walls are full of openings (windows, doors, etc.), while floors and roofs are relatively solid. Actually, TWICE the volume of block is required for floors and roofs than is required for walls. So why not go after this profitable market? Supply customers with wall, floor and roof units.



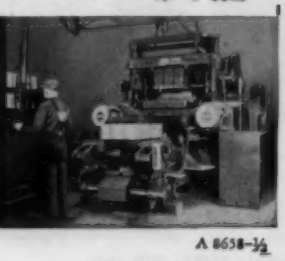
All these building units are made on a Besser Vibrapac. And the same Plain Pallets can be used. Get all the facts.

Write for Bulletin

BESSER COMPANY

ALPENA, MICHIGAN, U. S. A.

Complete Equipment for Concrete Block Plants



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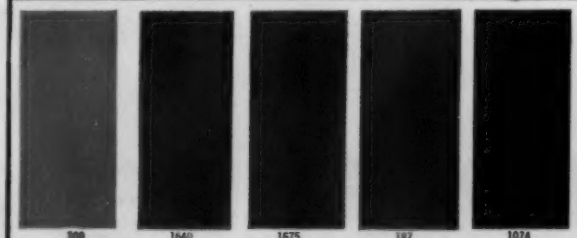

A guide for choosing concrete colors

For producers of split blocks, patio blocks, concrete blocks and other colored concrete products.

Manufacturers of colored concrete products agree . . . *The pigments they use must have these 3 important qualities:*

1. A high degree of tinting strength when added to the mix
2. Color uniformity year in, year out
3. The ability to incorporate easily

Manufacturers also require a pigments supplier whose technical department is capable and cooperative, whose shipping service is prompt and dependable.

Point for point, REICHARD-COULSTON quality-controlled pigments and dependable service meet *all* these requirements!

The shades shown above are just 5 of the many concrete colors manufactured by REICHARD-COULSTON. Included are yellows, buffs, maroons, grays, reds.

For a free color card, fill in and mail the coupon. Act now.

GENERAL RECOMMENDATIONS: PASTELS (*Split blocks and similar products*), 2-4 lbs. for each bag of cement. DEEP SHADES (*Patio blocks, concrete blocks, etc.*), 6-8 lbs. for each bag of cement.

Reichard-Coulston, Inc.

15 EAST 26th STREET, NEW YORK 10, N. Y.

Warehouses in principal cities; factory: Bethlehem, Pa.
Over a century of manufacturing and service

Natural — IRON OXIDE PIGMENTS — *Synthetic*

REICHARD-COULSTON, Inc. CM-96
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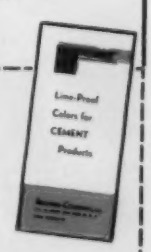
Gentlemen: Please send me a free card of REICHARD-COULSTON concrete colors.

My name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____



Palletized block has been placed by a fork lift on the trailer bed, and the lift truck has been hooked up in "tow-along" position behind the trailer, ready to travel to the construction site.

per day. At the same time the lift-truck can be available for use in the yard for a variety of handling uses, when it is not being employed for delivery service.

Attaching and detaching the fork-lift from the delivery truck is done in a matter of seconds, the engine is started, and the unit immediately goes to work. There are no tracks to lay, no trailers to unhitch and spot for unloading, and it is unnecessary to decrease the payload capacity of the basic vehicle to accommodate unloading devices when the tow-along method is used. With a single semi-trailer of approximately 35-ft. length, it is easy to conform to legal road length limits in most states.

One user who operates a Champ forklift truck in tow-along service, hauling on contract for a Los Angeles block manufacturer, reports an increase in his daily gross earnings of $110 per day after converting his delivery equipment from another type of truck-unloading device.

While the tow-along forklift delivery method is finding its widest application among concrete block-makers or among the haulers who make deliveries on contract, many forklifts are also being acquired by masonry contractors for on-the-job economies. One of these, a high-lift unit, is pictured in operation on a concrete-masonry construction job in Los Angeles. Contractor H. E. Jackson uses the lift truck to place cubes of blocks on the high scaffolds, to hoist filled mortar boxes, and to fill core columns with grout. In pouring the grout, a special Champ hopper fitted with a gate and mounted on the forks, is filled with concrete by the mixer at ground level and the pour made directly by opening the grout-hopper gate.

Here a box full of morter is lifted and set on the scaffolding. Oversize tires permit operation on soft ground.

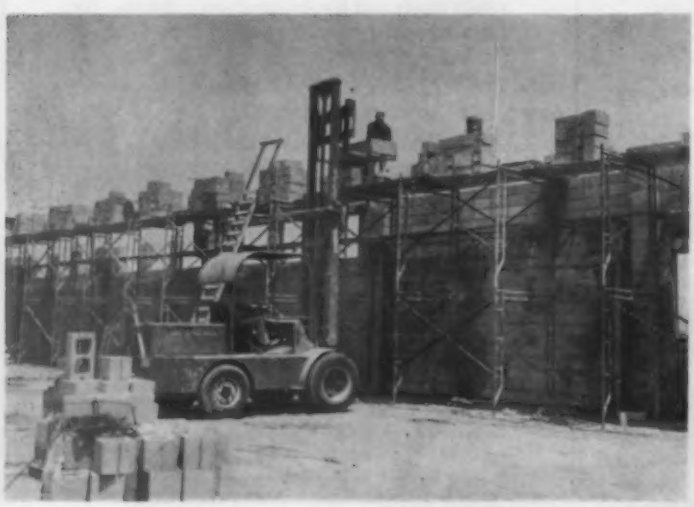
Below, right: The high lift unit placing a full cube of blocks directly on the scaffold, ready to be laid in the wall.

New N.R.M.C.A. Publication Helps Select Mixers, Trucks

Selecting the Best Combination of Truck Mixer and Truck for Optimum Efficiency is the title of a new publication of the National Ready Mixed Concrete Association, available to all ready-mixed concrete producers on request. The 10-page booklet was prepared by the Joint Committee of Truck Manufacturers and Truck Mixer Manufacturers Bureau.

Many of the old problems of the industry, as regards the best truck-mixer combination, payload, and transportation efficiency, are expertly covered in the publication. Several copies of the load distribution work sheet and check list on pertinent data are included, in a form which facilitates the solution of each case.

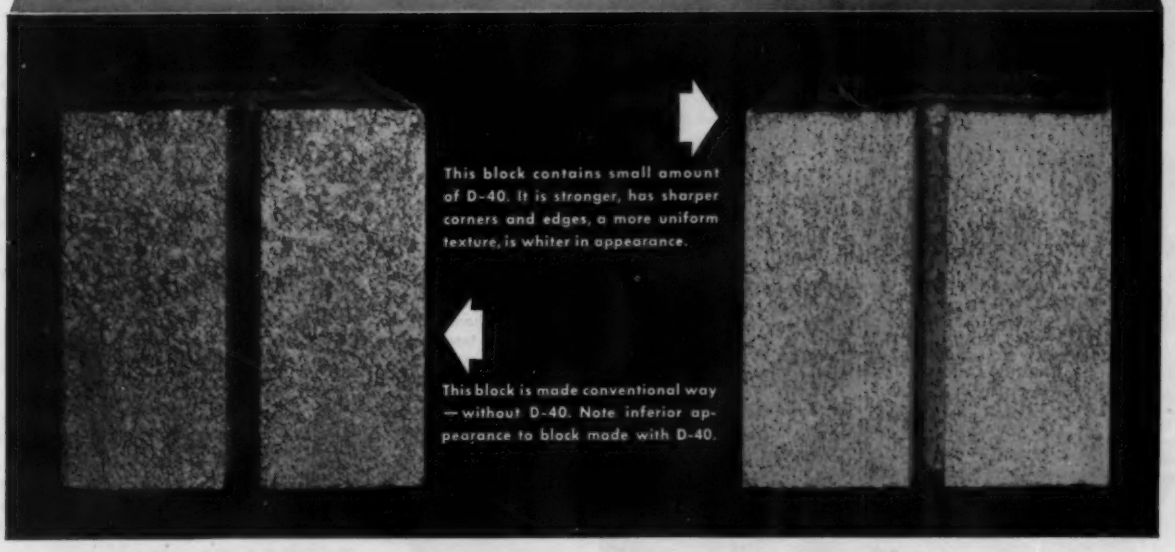
N.R.M.C.A. has purchased enough copies of the publication to make one available to all producers. Extra copies may be obtained for 30 cents each. Separate copies of the load distribution work sheet may be obtained for 15 cents each, by addressing the association at the Munsey Building, Washington 4, D. C.



Use D-40 in block manufacture to—

INCREASE PROFITS

IMPROVE QUALITY CONTROL


This block contains small amount of D-40. It is stronger, has sharper corners and edges, a more uniform texture, is whiter in appearance.
This block is made conventional way —without D-40. Note inferior appearance to block made with D-40.

Low-cost, high active D-40 has proved over the years to be most effective in up-grading cast concrete products

The increase in plasticity, imparted by D-40 to the wet mix, results in a better flow into the molds; provides more uniform dispersion of the cement; gives smoother, lighter-colored products with fewer rejects.

Only ½ to 2 ounces of economical, ready-to-use D-40 is required per bag of cement.

For complete information, sample and technical help, write or call the Oronite office nearest you.

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ORONITE CHEMICAL COMPANY

3054

Missouri Block Plant Diversifies Production

By BUREN C. HEROD

At the top of the raw material storage bins the main feed belt (left) discharges to a shuttle belt for distribution of aggregates to the appropriate bin.

Incoming aggregates received by rail at Concrete Products Mfg. Company's plant are handled by this under-track conveyor and main feed belt. At the left is a crusher used to crush lightweight block seconds, which are then returned to plant feed bins on the belt in the foreground.

A view of the 8½- by 106-ft. autoclave recently installed. In this unit the firm is now processing about 30 percent of its block production in a 2-phase curing system.

Another ON THE SPOT Report

THE growth of Concrete Products Manufacturing Company, Brentwood, Mo., which started 23 years ago when Ray J. McManemin, president, acquired a one-machine block plant early in the depression, has not only shown no abatement in arriving at its present status as the largest block producer in the area, but is currently branching out even further into the manufacture of additional lines of concrete masonry units.

The background of expansion of this progressive company — which now produces blocks at the rate of 4,500,000 units annually — includes the addition of two more block machines and, early this year, an autoclave. Further diversification of operation will soon be in effect with the completion of a 16,000-sq. ft. building which the company is presently erecting to house facilities for making prestressed lamp standards.

While concrete blocks are currently the company's basic product and represent 90 percent of the business volume, expansion into greater production of such items for mason and street contractors as sills, lintels, curbing, inlet stones, and water meter boxes is expected to add further improvement to the record of the last ten years, in which the firm experienced its greatest growth.

Located on a 5-acre tract, the plant site accommodates not only the block plant, autoclave, new prestressing plant, and outside casting areas, but also six block storage sheds (three more will soon be added) which provide for storing more than 3,000,000 blocks under cover. These sheds, designed by the plant superintendent and the plant engineer, are open on both sides for the full length, and have centrally supported roofs. This arrangement allows convenient access to blocks or storage space by lift trucks, which do not have to avoid outer support columns.

The entire operation is supplied with the bulk of its raw materials by rail shipments arriving on the plant's spur from the Missouri-Pacific Rail-

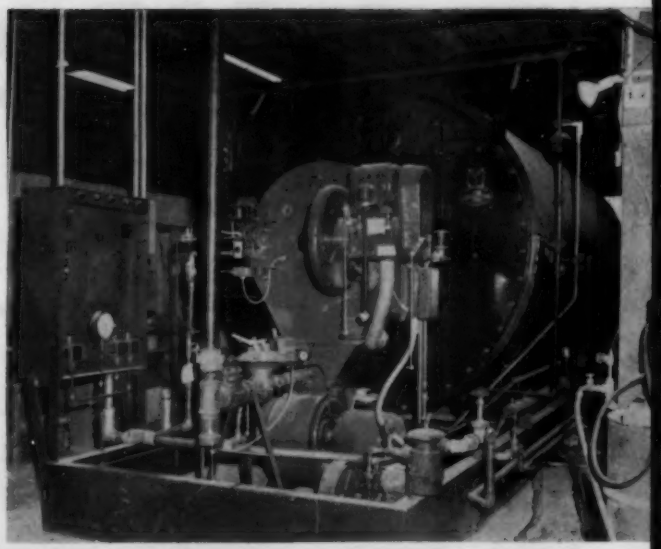
autoclave and prestress facility added in recent expansion

road's nearby mainline. Sand and gravel is received from Missouri Aggregates, a related company; cement is obtained from the Missouri Portland Cement Company; pumice from General Pumice Corporation, Santa Fe, N. M.; and lightweight aggregates — the only materials received by truckload — from the Hydraulic-Press Brick Company.

Railroad cars are spotted over a hopper below the spur track, and materials as discharged are transferred by a short conveyor belt to a 24-in. by 160-ft. conveyor. A WC 24 American Pulverizer hammermill, driven by a totally enclosed 25-hp. G-E motor, has been installed to crush lightweight aggregate block "seconds". The ⅜-in. top size aggregates thus reclaimed are fed to the main belt along with the Haydite received in the same hopper from truck shipments.

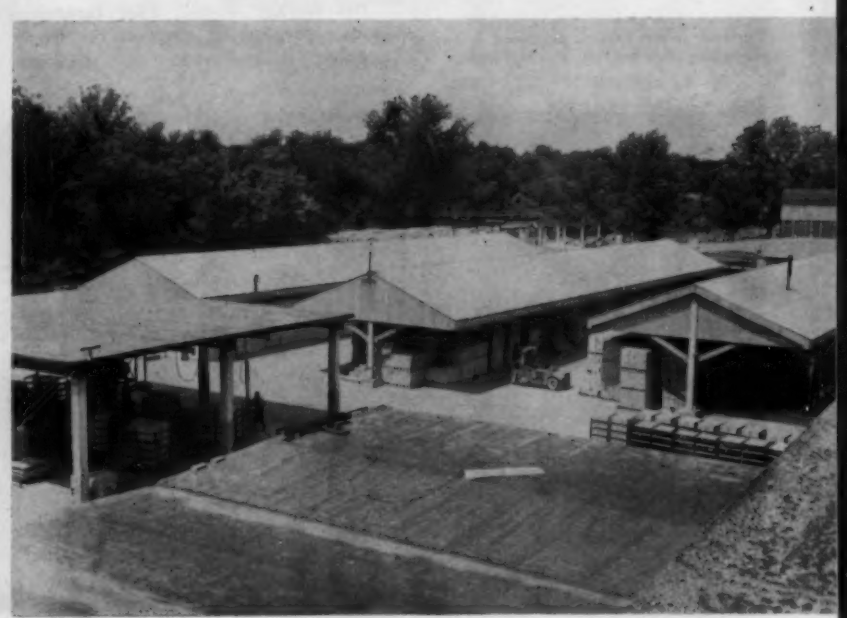
At the top of the storage bins, the main conveyor discharges to a 24-in. shuttle belt that distributes each material separately to the appropriate one of seven bins. These have a total capacity of 480 tons. All conveyors were company-fabricated of Link-Belt parts. The bins accommodate two sizes of lightweight aggregates, pumice, gravel, and cinders. A single-deck, 4- by 6-ft. Simplicity screen, fitted with 1-in. screencloth, grades the cinders before they are chuted to their bin. A short, swivelling belt conveyor at the end of the shuttle belt was installed to transfer material from the latter to one of the end bins or, by being swung to one side, to discharge into a truck chute from which materials may be hauled to the precasting areas.

Facilities for handling and storing bulk cement include an under-track hopper adjacent to the block plant, a 710-bbl. cement bin, and the screw and bucket elevator system that transfers the cement from the track hopper to the bin. This equipment was supplied by the C. S. Johnson Company.



This 350-hp. boiler is supplied with softened water for the production of steam (at a pressure of 150 p.s.i. and a temperature of 355 deg. F.) which is used in the high-pressure curing operation.

Precast lamp standards (foreground) will soon be at peak production, involving prestressing operations in the new plant building (background).



This view of a part of the plant yard shows the 4-station cubing facility (left) and a few of the open-sided storage sheds, which have centrally-supported roofs.

Some of the firm's key administrative and operating personnel: A. K. Atkinson Jr., general manager; Walter Hooker, plant superintendent; Darrell Brown, assistant plant superintendent; Sam Philbrook, machine room foreman; and William Billard, yard foreman.

Materials for batching are gravity-fed from the bins to a monorail-mounted, Butler weighbatcher of 50-cu. ft. capacity. The weighbatcher is propelled by a Monotractor overhead power unit mounted on a parallel 6-in. I-beam monorail. The drive is furnished through a fluid coupling by a 1½-hp. totally-enclosed motor. Following transport to the mixers for the three Besser block machines, water is automatically added to the batch in the mixers through a Roy Darden Industries water control unit.

Each of the two newer block machines is equipped with Besser automatic height and density controls, and each is set to produce 1,000 8-in. equivalents per hour, while the older unit averages about 850 blocks per hour. The new machines have a front-pallet feed and magnetic offbearers; the older units a hydraulic offbearer and rear-pallet feed. All are operated on one 9-hour shift.

Curbing, shown here, is produced in one of the company's outside casting areas.

As removed by the offbearers, pallets of three blocks each are placed on 5-tier block racks having a capacity of 60 8-in. equivalents. Four Crescent battery-powered platform lift trucks are employed in transferring the racks from the block machines to the curing rooms and, following the low-pressure curing cycle, to the cubing station.

The 12 curing rooms provide a total capacity of 18,360 standard 8-in. equivalents. After a 2-hour preset period for the blocks, high-temperature steam is introduced, not exceeding 60 deg. F. per hour, until the curing temperature of 165 degrees F. is reached. The steam is delivered to the curing rooms at a pressure of 12 to 18 p.s.i. from either of a pair of low-pressure boilers.

After curing overnight, the block racks are transferred to an outside, four-station covered cubing department which is centrally located with respect to both the block plant and the storage sheds. Two turntables are provided for each of the Besser cubers in the open-sided structure. Four 6,000-lb. lift trucks (3 Hyster and 1 Clark) are used to transport block cubes to the storage sheds described previously.

At present, about 30 percent of the block production is put through a two-phase curing system involving the new autoclave. The shell of this 8-ft. 6-in. by 106-ft. unit was made by the Nooter Corporation of St. Louis, and the door was furnished by Anchor Pressure Door. It is covered with fiberglass and asbestos insulation, and will accommodate 4,400 blocks in each high-pressure steam curing cycle.

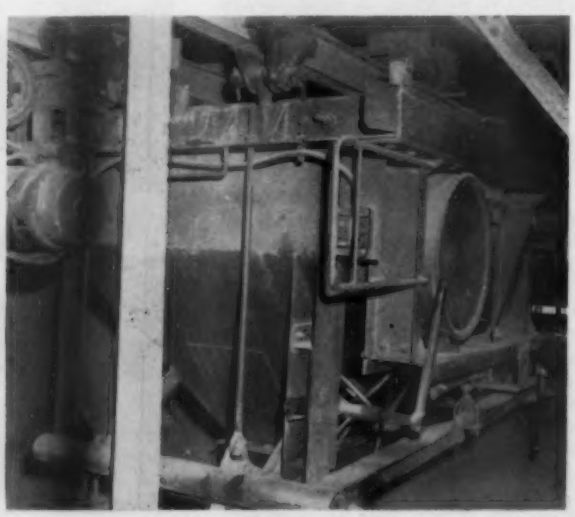
Blocks are introduced into the autoclave either from the cubing station or the storage area. Steam for the high-pressure phase covering an 8-hour cycle is furnished by a 350-hp. Johnston boiler at a pressure of 150 p.s.i. and a temperature of 355 degrees F. A Kisco water softener with a 1,000-gal. preheating unit furnishes preheated soft water for the boiler, which is equipped to burn either oil or gas.

A change in burner systems can be made in 3½ minutes by merely swinging into place the oil burner that is hinge-mounted on the face of the boiler, and shutting off the gas system, or *vice versa*. The new boiler can furnish steam for any part of the present plant, and the new building now under construction; the two smaller 60- and 75-hp. boilers are used primarily for the low-pressure curing rooms.

Precasting of special units such as coping, sills, and other items of a

(*Continued on page* 292)

The propelling unit (left) moves the monorail-mounted weighbatcher to each of the three mixers which supply the trio of block machines.



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Development Of Cavity Wall Concrete Units

new composite block meets rigid requirements

A workman demonstrates the ease of setting up the new system of cavity walls. No mortar is used; the joints later are pointed by hand or with a mortar gun.

AN efficient system of producing concrete block units which will form a true full-cavity wall has long been sought by the industry. While this objective has been achieved to a degree by several desirable methods, each of these systems lacks some necessary component of such a wall. The term "cavity wall" has been used to describe a composite wall, built of two vertical sections, or wythes, separated by an air space, but so constructed that the two walls act as one in furnishing lateral stability to the structure.

Such a wall was first conceived to increase thermal insulation, to eliminate moisture penetration, to reduce sound transmission, and to provide greater strength in resisting vertical bending of the wall under abnormal stresses, such as excessive winds of hurricane force. Corollary to these primary objectives are other functions of the wall which must be guaranteed if it is to be satisfactory. The maximum of unrestricted space must be provided between the two walls so that insulation may be installed if this is considered necessary. There must be a means of disposing of any accumulation of water which might penetrate the outer wall, before it is high enough to pass through the inner wall. Finally, whatever device is used to hold the two wythes in position, it must not convey moisture across the bridge or tie.

An automatic high-production block machine which makes the cavity wall units, inserting the cross pins without production slowdown.

To obtain an efficient cavity wall, one must use units made on a high-production block machine permitting the construction to be competitive in cost-in-place with other systems. These other systems would include all types of wall and all materials. In addition to cost-in-place, comparative data should include strength, resistance to moisture passage, insulation, sound transmission drying shrinkage or temperature contraction, long life, cracking, bond, surface texture, color, etc. The requirements are numerous, but the rewards accruing from a satisfactory cavity wall system are likewise satisfying.

With few exceptions, designers of cavity wall units have pursued their work to date on the basis of creating two separate units, one for the outer wall and one for the inner, both solid in form, and have held these two (usually identical) units in place with some type of tie, an interposed concrete web, a metal bar, or reinforcing. Further, they have in the main designed the units to be set in place in a mortar bed, both horizontally and vertically, thus depending upon the efficiency of the mortar bond and the volume stability of the block unit to resist cracking or movement. It appeared to such designers that the conventional method of laying up a concrete block wall is—with considerable justification—a satisfactory one.

The few exceptions mentioned above marked the first departure from the conventional use of *two* separate blocks for the inner and outer wythes of a cavity wall. Those who conceived the practical method of manufacturing both wall units on

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The department's operation is twofold—field service and research. The field engineer assists you in planning on the job site. He may suggest improvements on the spot or he'll send soil samples or construction plans back to research for recommendations. Research, in turn, has two functions—the testing of present materials and development of new ones to improve construction or stabilization methods, and the solving of customers' problems through testing and analysis. For this dual task, Dow has not only its own Soils and Construction Materials Labs, but the assistance of dozens of other laboratories.

Department members serve on committees of organizations such as the American Society for Testing Materials, the American Concrete Institute, Highway Research Board, American Road Builders Association and the American Association of State Highway Officials.

When you have a problem, put their pool of knowledge and facilities to work for you. They are another reason for buying calcium chloride from Dow—you pay no more, you just get more for what you pay. For further information, write Dept. IN 900R, THE DOW CHEMICAL COMPANY, Midland, Michigan.

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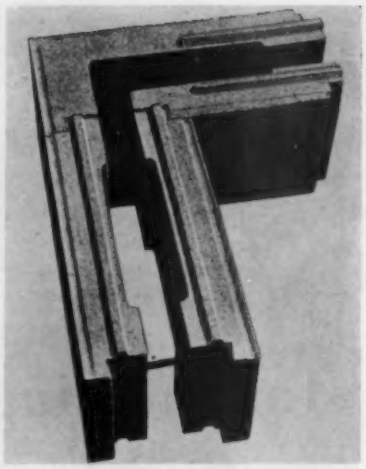
a high-production block machine *simultaneously* thus offered the mason the desirable means of handling *one combined unit* at a time, which because of its high production rate, was competitive in cost.

These same designers, however, still went along with the conventional mortar bed for holding the units in place. Disruption of this bond with mortar by the lateral movement or shrinkage of the masonry units under volume change is the underlying cause of cracked masonry walls, one of the most serious indictments of concrete masonry walls.

Another consideration affecting the efficiency of a cavity wall would then include perhaps the elimination of the conventional mortar bed and the substitution therefor of some means of holding the units in accurate alignment and position. The idea of providing keys along the top and end surfaces of the units to accomplish this is not new. In fact, it was one of the first methods proposed to insure true alignment of a masonry wall. The more recently developed systems of obtaining true machine compaction of the top, bottom and end surfaces of blocks, however, have made it easily possible to build such keys into the units without sacrificing the high production rate of the modern block machine.



Interlocking assembly of stretcher and corner blocks offered in the new system of composite units for forming full-cavity walls.

A vertical dovetail key formed in the ends of the unit has also been used in the past to lock each individual block into place. This device took various forms, some more efficient than others, in protecting against lateral as well as longitudinal movement of the units. Accurately formed in the modern moldbox, these dovetail slots and projections at the ends of the units permit a degree of flexibility in the wall which, while minute in amount, is sufficient to relieve the buildup of longitudinal stresses to the point of causing cracking.

It remained, therefore, in creating a unit to form an efficient cavity wall, to provide a strong lateral tie having the requirements mentioned above. This tie between the inner and outer walls must be incorporated into the composite unit while it is manufactured on the modern machine. If it is formed of a concrete web—as is done in some systems—it may possibly provide a path for the transfer of moisture across the space, especially if the blocks are made of lightweight aggregate producing a concrete of more or less high absorption.

It would appear, therefore, that the tie should be a metal bar, of a form which would permit its ready introduction into the proper place in the concrete unit as it is being vibrated into final form. It must be of sufficient length to project well into both inner and outer units, of sufficient cross-section area to resist distortion from longitudinal stresses, and preferably of deformed surface, to increase its bond with the concrete

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LEFT TO RIGHT: PAUL PAVISH, L. J. PAVISH, LEO PAVISH, JR.

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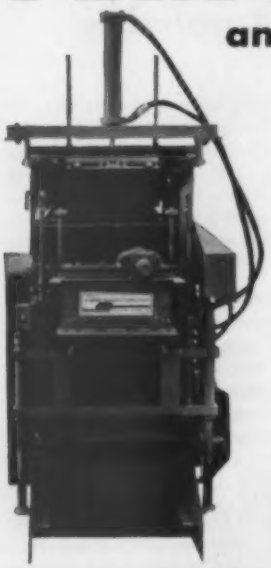

The men from Pavish wanted a machine that would give *performance* – efficient, economical, trouble-free performance, year after year. That's why they chose Fleming's FMC-180, for a smooth operation *at the touch of a button!* They wanted the 180 because it produces clean, sharp-edged blocks of different heights from plain pallets; because it eliminates the need for an extra man; because it vibrates under pressure; because of its efficient, economical hydraulic power plant. They obtained *all* these money-making features in the FMC-180 – and *you can too* – at a cost *far less* than any other comparable precision-engineered block machine on the market today!

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Also request information on:

- ☐ Automatic Double Block Machine
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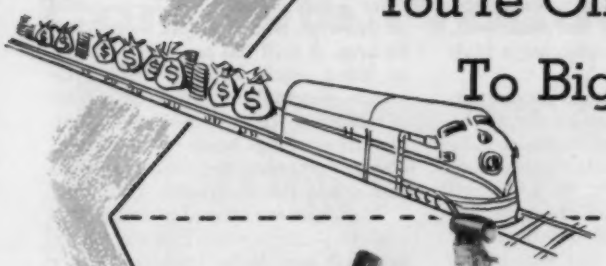

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and to allow any moisture accumulations to drop harmlessly to the bottom of the wall. Any water accumulating there can flow to the outside through weep holes.

Such a cavity wall composite unit has recently been offered to the industry by Presto Brick Machine Corporation, of New York. The features of this unit, which meet almost without exception the requirements enumerated above, are shown in the accompanying photographs. Shown also is the automatic high-production block machine, manufactured by the Columbia Machine Company, Vancouver, Wash., which seems to accomplish the mechanical incorporation of the various features of the unit while it is being manufactured, at the same time maintaining a high rate of production.

Two motion pictures of production of this block unit were shown at the recent meeting of the National Cinder Concrete Products Association, held at Atlantic City, N. J. Joseph Wolff, the inventor of the new system, presented details relating how the original unit has been extensively used in South Africa in low-cost housing construction. It was claimed that a team of unskilled labor could place 1,200 8- by 8- by 16-in. units of this type in a wall per day. After an area of wall has been set in place by hand, each joint is pointed by means of a mortar gun, with a fillet of mortar or sealing compound which fills the openings between blocks and also the running depression formed just inside the horizontal joint line.

The units are offered in full length (16 in.) stretchers, half-stretchers, and left and right corners. Corner units have a thin interposed and formed web of concrete between the inner and outer wall portions of the unit, which is easily knocked out with a hammer after that portion of the wall is set in place. Each stretcher unit has two ⅜-in. diameter deformed reinforcing rods spanning the air space and deeply imbedded at each end into the twin walls. Other details—horizontal keys, dovetailed end keys, and general shape of the units—are shown in the accompanying pictures.

The Presto company has set up a new plant in the Bronx, N. Y., and the management expects to make production runs of units in the next few months. It was stated that merchandising and sales plans to assist franchise holders are now in the process of development.

Cemex Plant to Be Moved From Illinois to Arizona

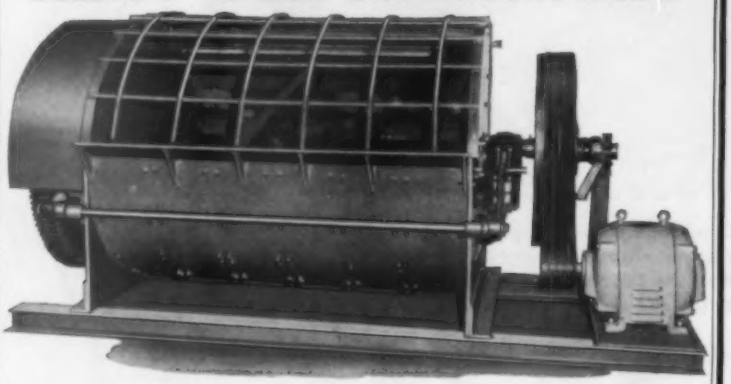
An industry will make a long jump about the first of next year when the Cemex Corporation relocates its plant, formerly in Quincy, Ill., in Yuma, Ariz. M.S. McKinnon, present operator of the firm in Quincy, will remain president of the concern. He will be joined by five residents of Yuma in a new incorporation of the business: M. W. Beatty, J. Atmar, Walter Norton, Doyle Bullard, and B. W. Jones.

The equipment at Quincy will be dismantled and shipped to Yuma, where a new building will be erected and additional machinery will be installed. It is planned to build a plant with approximately 28,000 sq. ft. of floorspace.

Cemex, product of the corporation, will be a building material composed of excelsior, mixed with cement and chemicals and formed into sheets or slabs. According to a marketing survey prepared by the Stanford Research Institute of California, this new plant's total annual capacity (estimated at 15,000,000 board ft.) will constitute only 3 percent of the potential market in the 11 Western states.

12 Cubic Foot to 75 Cubic Foot

KENT BATCH MIXERS



This large capacity mixer combines features that assure safe, convenient operation and large output of thoroughly mixed concrete *economically.*

Gearing is precision cut. Motor, positive action clutch, belts and bearings are specially designed for heavy duty. Motor and bearings are sealed to exclude dust and grit.

Mixing blades are a superior quality of cast steel. Liners are of sectional type cast from NI-HARD metal, in the larger size mixers. They will render exceptionally long service and may then be replaced easily.

Write for information regarding the complete Kent line of Batch Mixers or Kent Continuous Mixers if interested in this type.

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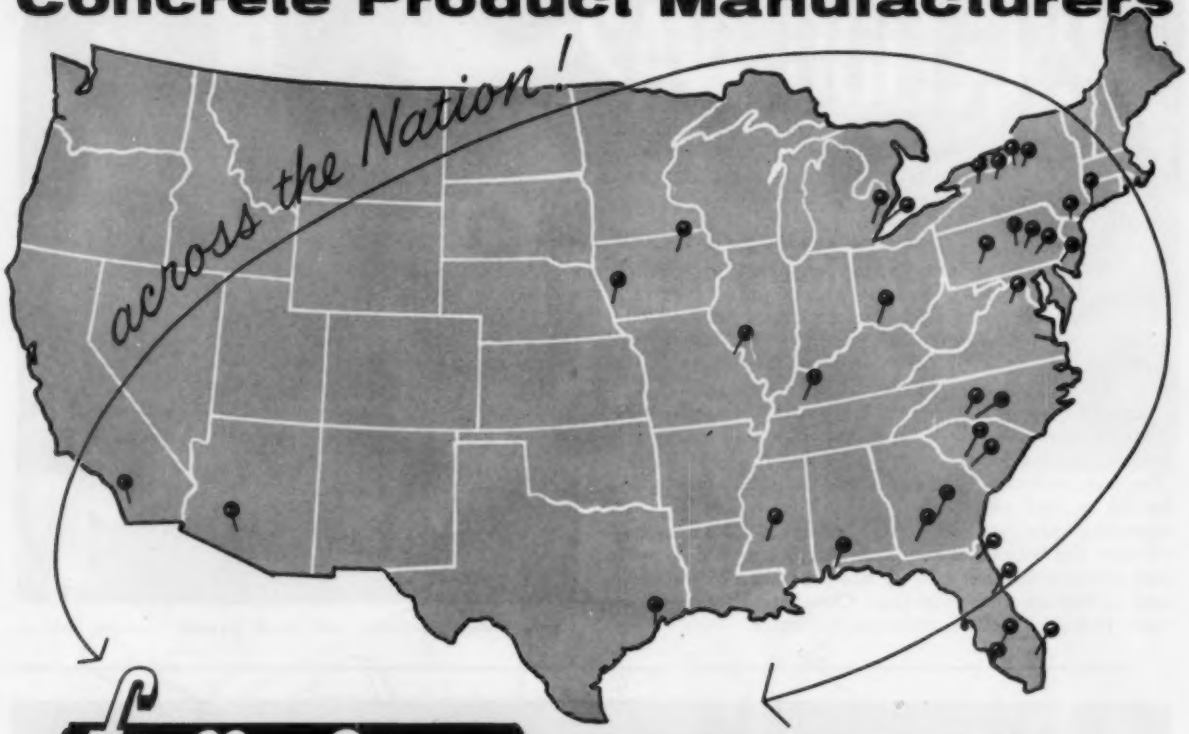
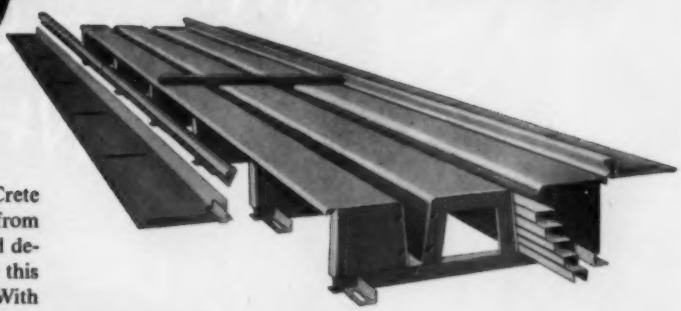
The choice of Prestressed Concrete Product Manufacturers



FORM-CRETE® STEEL FORMS



The immediate acceptance and purchase of Form-Crete Steel Forms by prestressed concrete manufacturers from coast to coast provides ample assurance of the sound design, practical rugged construction and economy of this new innovation in the prestressed concrete field. With the addition of a line of I-beam forms engineered for casting all standard specified sizes of prestressed concrete I-beams we offer the most complete line of coordinated interchangeable forms and accessories obtainable anywhere. A new revised catalog is available soon—write for your copy today.

FORM-CRETE DOUBLE-T ALL-STEEL CASTING FORMS—*By utilizing a variety of gout forms and stem heights an ingenious manufacturer can easily surpass the 37 individual prestressed concrete castings that we conservatively estimate may be produced from this one all-steel form assembly.*

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PF-5

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R.M.C. Truck Hopper Vibrator Speeds Movement of Concrete

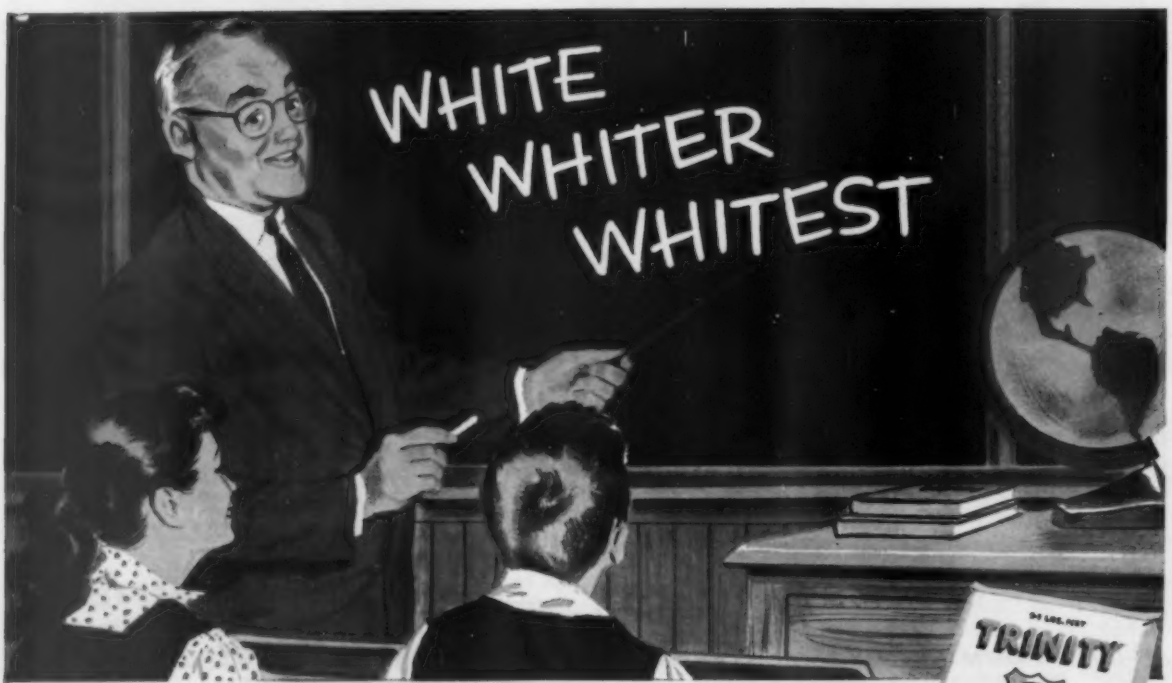
The readiness of low slump concrete to build up and stick in the charging hopper of a ready-mix truck, and occasionally surge out onto the ground, is a well known characteristic of ready-mix.

Usually a man must be stationed at the side of the hopper with a shovel to prevent the concrete from sticking, building up, and overflowing. The use of hosed water to wash down the remaining concrete clinging to the inner sides of the hopper is a practice which is frowned on by good operators, as this extra water, going down into the drum, tends to lower the water-cement ratio.

A handy vibrator unit, made by Cleveland Vibrator Company, Cleveland, Ohio, offers one solution to this problem. As is seen in the accompanying picture, the driver hooks the unit onto the top side of the hopper and turns on the pneumatic unit, allowing this device to operate while the concrete is flowing into the hopper.

The vibrator unit consists of a Cleveland Type V pneumatic vibrator with a 2-in. piston, mounted on a pipe handle long enough to reach up to the top of the hopper. The unit, including the cast-iron hook, is only 8¼ by 3½ by 3½ in., and weighs only 15 lb. A Cleveland Type JN operating valve, weighing an additional 1½ lb., is mounted near the bottom of the pipe. Air is supplied to valve and vibrator through a ¼-in. hose, attached to the valve, and carried up to the vibrator. Cleveland Vibrator Company furnishes both the valve and vibrator.

Handy pneumatic vibrator unit which prevents concrete build-up.



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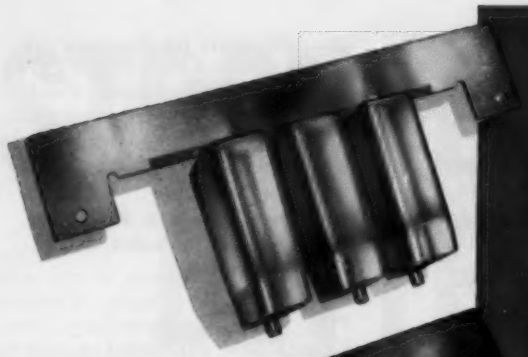

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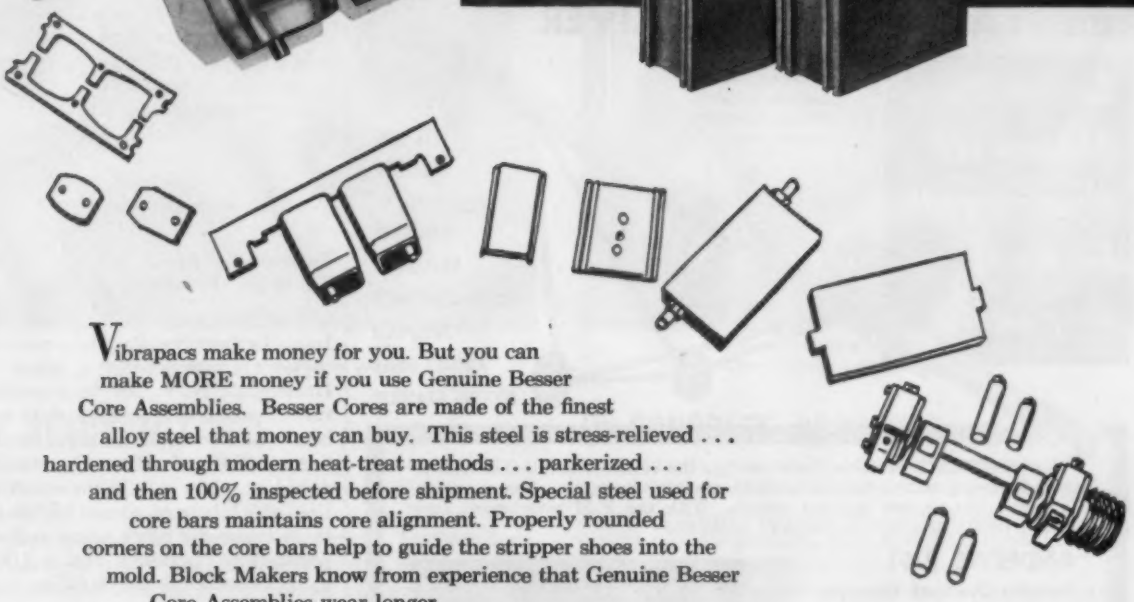
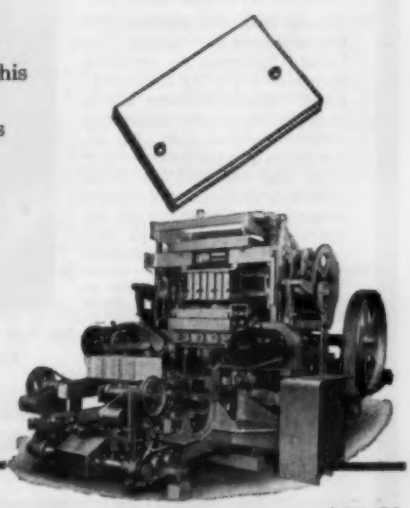


Vibrapacs make money for you. But you can make MORE money if you use Genuine Besser Core Assemblies. Besser Cores are made of the finest alloy steel that money can buy. This steel is stress-relieved . . . hardened through modern heat-treat methods . . . parkerized . . . and then 100% inspected before shipment. Special steel used for core bars maintains core alignment. Properly rounded corners on the core bars help to guide the stripper shoes into the mold. Block Makers know from experience that Genuine Besser Core Assemblies wear longer.

Tip to Block Makers — A concrete block made with worn cores and division plates is about 2 lbs. overweight. If you multiply this by the number of block produced each day, the figures become staggering. So play safe. Use Genuine Besser Parts. The savings in dollars on a single day's production will pay for the parts.



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Complete Equipment for Concrete Block Plants

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A 102-1PC

Italians Watch Production Of Block in Philadelphia

Interested visitors from Italy recently inspected the facilities of the Cottman Builders Supply Company in Philadelphia, Pa., where they saw in action the big machines which turn out cinder block at the rate of 25,000 a day in two 8-hour shifts.

The nine Italian men were on a six-week tour of the United States, a project sponsored by the International Co-operative Administration and the Housing and Home Financing Agency, Washington, D. C. They were seeking information which will be used in Italy's program to supply more than 2,000,000 public and privately-financed housing units during the next ten years.

Florida Claims Top Honors In 1955 Block Production

According to data compiled by the Florida Concrete and Products Association, Inc., Florida's concrete masonry industry ranked first in the United States during 1955.

This organization reports that producers of concrete block in that state turned out more than 280,000,000 8-in. equivalents during the year. Since the figure for the whole country last year was slightly over 2,000,000,000, Florida produced about 18 percent of the total—a claim which the association points out cannot be made by any other state.

Niagara Concrete Pipe, Ltd. Adds Three to Sales Staff

Three appointments in the sales department of Niagara Concrete Pipe, Ltd., St. Catherines, Ont., Canada, were announced recently by T. A. Rigby, president.

Ira Quinby previously assistant city engineer of Tonawanda, N. Y., was named sales manager of the firm. He has also had experience as a structural field engineer with the Portland Cement Association, and with concrete manufacturing firms in Montreal and Toronto.

J. D. Sproat, also appointed to the Niagara Concrete Pipe sales staff, formerly was associated with firms in the construction field.

A. B. Patterson was affiliated with Great Lakes Coal, Ltd., Toronto, and Scarfe & Company, Brantford, Ont., before joining the Niagara Concrete Pipe sales staff.

Turbotville Block Co. To Make Prestressed Units

The Turbotville Block Company, Inc., Turbotville, Pa., has recently begun construction of a plant in Horseheads, N. Y., for the manufacture of prestressed concrete slabs and beams and concrete building blocks.

According to Allen G. Stamm, president, plans call for the construction of a plant of about 28,000 sq. ft. to house the block plant and the prestressing operation, and a 2,000-sq. ft. warehouse for building supplies.

Two Cleveland Concerns Build Facility in Florida

Among the newer industries in the Ft. Lauderdale, Fla., area is the pipe manufacturing plant recently completed by the United States Concrete Pipe Company and the Universal Sewer Pipe Corporation, both of Cleveland, Ohio.

The new venture will produce concrete pipe in all types and sizes, including vitrified clay-lined concrete pipe, and Tylox flexible couplings for concrete pipe jointing. Occupying a site of 20 acres, the plant has more than 12,000 sq. ft. of manufacturing space. W. R. McGarry will direct operations at Fort Lauderdale.

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The ANDREWS Portable Conveyor has the versatile abilities to handle a large variety of free flowing uniform granular materials. Also available in permanent models without wheels. With the P-51 attachment (see below, right) its scope is virtually unlimited.

ANDREWS P-51
Portable Overtrack Conveyor

Teams with the ANDREWS Portable and Permanent Tubular Conveyor to perform double-duty at Cement, Ready Mix, Concrete Block and similar plants unloading covered hopper cars. No pit has to be dug under the track with the ANDREWS P-51 eliminating the usual water hazard. A railroad car can be spotted at any point and unloaded at a moments notice.

The P-51 is shown feeding into an ANDREWS Portable Tubular Screw Conveyor.

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Columbia Calcium Chloride can be added to the mix either at the plant or job site.

Blocks are taken from drying kiln. Columbia Calcium Chloride is used the year 'round.

IN READY MIX. Ready mix producers can do a real service for customers by suggesting the use of Columbia Calcium Chloride in the mix. Calcium Chloride is excellent for hot weather and fall use because it more than doubles the one day strength of concrete. In three days the strength is 50% greater. Translated into practical field application, this means earlier removal of forms and faster construction schedules.

Curing is also considerably improved by the addition of Columbia Calcium Chloride. At the early ages of setting, when the retention of moisture is extremely important, non-treated concrete loses 60% of the original mixing water in the first 225 minutes, while Calcium Chloride treated concrete loses only half as much!

Always recommend the addition of Columbia Calcium Chloride to your ready mix customers. The cold weather advantages are even more pronounced.

IN CONCRETE PRODUCTS. No matter what your concrete products . . . blocks, pipe or precast . . . the use of Columbia Calcium Chloride will improve production and lower manufacturing costs. These advantages apply to quality concrete products, with or without steam curing.

The initial set is reduced more than 50 per cent. Three day strength is achieved within 24 hours. This reduces the number of cracked units and permits less damage in earlier handling periods, quicker removal from pallets, reduced pre-steam wait, faster more dependable curing.

Concrete units reach higher ultimate strength. This means earlier delivery, smaller inventory, lower manufacturing costs, greater profits for you.

Throughout the year, Columbia Calcium Chloride gives you better products, in shorter time, at less cost. Columbia Calcium Chloride works equally well with normal, air entrained, or early high strength cements.

Write today for complete information...Please specify whether your interest is in ready mix or concrete products

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SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY
ONE GATEWAY CENTER · PITTSBURGH 22 · PENNSYLVANIA

DISTRICT OFFICES: Cincinnati • Charlotte • Chicago • Cleveland
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Dallas • Houston • Pittsburgh • Philadelphia • San Francisco
IN CANADA: Standard Chemical Limited and its Commercial Chemicals Division

Missouri Block Plant

(*From page* 280)

cast stone nature (also a dry-mix operation) is carried out in a building separate from the block plant. Outside precasting areas are used for curbing, meter boxes, and similar products mentioned earlier. The new prestressing operations which will be housed in the new plant building will be done under license from the American Concrete Company, and the lamp standards thus produced will be marketed in Mid-central and Southern states.

Production of the above units, plus the full line of modular and control joint blocks of four aggregate types, is handled by a 58-man crew and four supervisors headed by Walter Hooker, plant superintendent. A fleet of 16 contract haulage trucks are required to handle delivery of all products.

Mr. McManemin and Mr. Hooker have been associated since 1933 and have built this thriving business from "scratch". Each has made a basic contribution to its growth—Mr. McManemin in forseeing and developing markets and sales, and Mr. Hooker in building and maintaining an efficient operating department. Arthur K. Atkinson Jr., who previously was an official of a hydraulics engineering firm in Philadelphia, was recently brought into the organization by Mr. McManemin to take the post of general manager.

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WITH THE

NATIONAL Car Shaker

Patented

- Soon pays for itself
- Keeps your men out of R R cars
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National Conveyor & Supply Company

348 N. Harding Ave. Chicago 24, Illinois

N.R.M.C.A. 1956 Short Course To Be Held November 23 to 30

The 11th annual short course of instruction of the National Ready Mixed Concrete Association, for concrete industry technicians and representatives of the sand and gravel companies, is to be held this year at the University of Maryland, College Park, Md., on November 26 to 30.

The course will be similar to previous ones and, as last year, will include discussions related to bituminous mixtures in addition to the more comprehensive instruction on concrete and concrete aggregates. While the pattern of previous courses will be followed, there will be some rearrangement of subject matter and emphasis.

Further information and registration forms may be obtained from Stanton Walker, director of engineering of the association, Munsey Building, Washington 4, D. C.

A. C. Horn Company of Texas To Have New Houston Plant

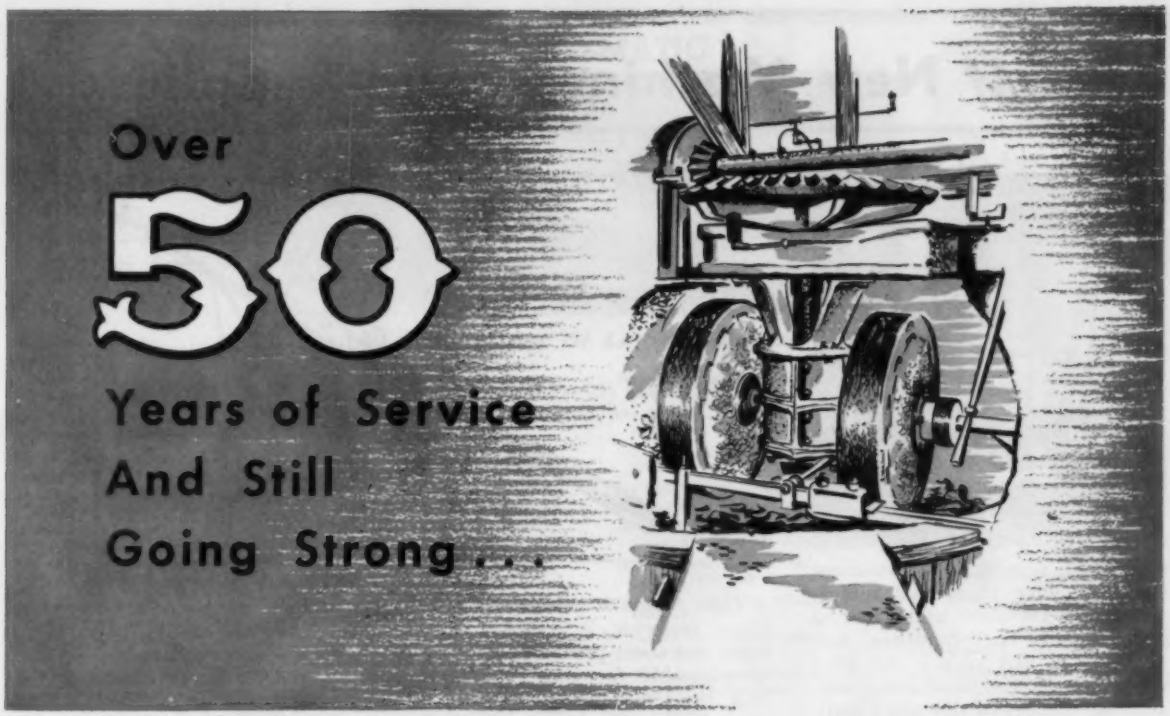
As the first step in greatly expanding operations of its subsidiary, A. C. Horn Company of Texas, the Sun Chemical Corporation has authorized funds for building a new manufacturing plant on the 18-acre site which it owns in Houston.

Ralph C. Persons, Sun Chemical's president, stated that the new building will serve as a manufacturing, warehousing, and sales center for the complete line of A. C. Horn paints and construction and building maintenance materials.

A. C. Horn Company now owns manufacturing plants in San Francisco and Bell Gardens, Calif., Long Island City, N. Y., and Toronto, Canada, as well as in Houston. A network of branch offices and warehouses was set up to service all 48 states and the important Canadian industrial districts.

At Frankfort, Ind., completion of the first phase of a $150,000 concrete products plant being erected by Barker Materials, Inc., is scheduled in the immediate future.

Grover C. Beiter, who was for many years manager and vice-president of the White Concrete Company, Des Moines, Iowa, died after a heart attack on June 26.



A pair of American 9-foot dry pan grinders have been working day in and day out . . . year in and year out . . . for Whiteselle Brick & Lumber Company at Corsicana, Texas, since shortly after the turn of the century. Company officials estimate that these grand old troopers have ground material for more than 450 million brick so far . . . and both seem to have years of useful service left in them.

Today . . . as 50 years ago when they were new . . . they are handling nine yards of shale and clay per hour, working 9 hours a day and five days a week.

"The service record of these grinders does the talking for American Clay machinery," said a company spokesman. "All we've had to replace have been the grinding tires and muller and screen plates."

In the American files are many similar case studies.

This same rugged construction and dependability is built into American grinders of today . . . plus modern design that means increased efficiency and bigger volume production. American offers a complete line of eight grinders ranging in capacity from 15 to 80 tons per hour. You owe it to yourself to get all the facts on American grinders before you buy. For a profitable consulation without obligation. . .

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American CLAY MACHINERY

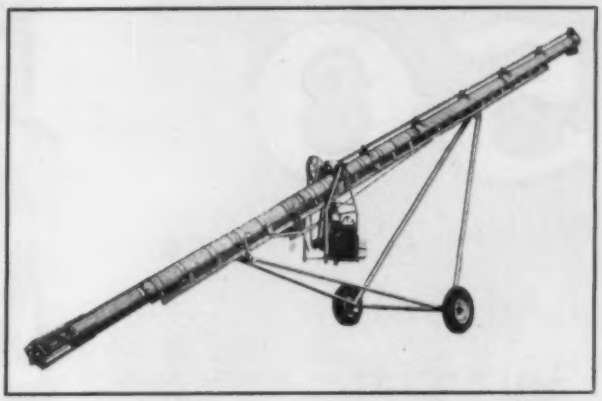
A Division of HUBER-WARCO Company
Marion, Ohio, U. S. A.

PLANTS IN MARION AND BUCYRUS, OHIO • CABLE ADDRESS: HUBARCO
CLAY MACHINERY • GRINDERS • ROAD ROLLERS • MOTOR GRADERS • MAINTAINERS

CM New Machinery and Supplies

• Reduced footing and basement costs are some of the advantages claimed for Formbloc, manufactured by Duracrete Block Company, Inc. Formbloc is laid up dry and filled with concrete. The interlocking, self-aligning features of this block facilitate greater production. The illustration shows an eight inch Formbloc assembly. In the foreground 8 and 12 in. Formbloc units are shown. The ends of the horizontal reinforcing units extend beyond the edge of the panels. These are tied together with hooked reinforcing rods (foreground). The core area in the panel shown is ready to be filled with concrete for which the block acts as a form. ▲ (101)

• Plasti-Grip, a 3-in-1 joint made of extruded plastic, was recently introduced by Progress Unlimited Inc. Designed to give the most effective joint between two pours of concrete, Plasti-Grip's deep grooves grip securely into the concrete; its reinforced, U-shaped center pleat expands and contracts with the joint. According to the manufacturer, Plasti-Grip resists water pressures up to 125 feet head, stays flexible in very low temperatures, and is resistant to alkali and acid. ▲ (102)



• The Andrews portable tubular screw conveyor is compact, dust-tight, and water-proof. It is especially adaptable for conveying heavy bulk free-flowing materials such as cement. Features include simplicity of design, durability, ease of installation, and economy of operation. The conveyors are regularly manufactured in screw diameter sizes of 6, 9, and 10 in. In each case the tube dimension is 1 in. larger. All types are available in lengths ranging to 60 ft. ▲ (103)

SEPTEMBER, 1956

MORE INFORMATION PLEASE

THE CONCRETE MANUFACTURER
431 S. DEARBORN ST.
CHICAGO 5, ILLINOIS

Please send more information on items described in editorial columns of this issue, as circled below.

101 102 103 104 105 106 107 108 109 110
111 112 113 114 115 116 117 118

Name_____ **Title**_____

Company_____

Address_____

City_____ **Zone**____ **State**_____

SIDE-O-MATIC

Progressive Meekins, Inc. of Florida now have 2 Side-O-Matics in their fleet.

Meekins, Inc. are both quality- and service-minded.

PARTIAL LIST OF SATISFIED USERS:

Best Block Company, Jacksonville, Florida—2 units
Alico Concrete Products Co., Inc., Patchogue, L. I., New York
City Cement Blocks Co., Bridgeport, Connecticut—3 units
The Ideal Builders Supply and Fuel Co., Cleveland, Ohio—2 units
Apex Coal and Supply Co., Cleveland, Ohio
Binkley and Ober, Inc., Best Petersburg, Pa.—2 units
The Michigan Silo Company, Peoria, Illinois—2 units
Joseph M. Ripley, Inc., Jacksonville, Florida—2 units
M. L. Dague Company, Muncie, Indiana
R. I. Lampus Company, Springdale, Pennsylvania
Pick's Pack-Hauler, Blue Hill, Nebraska
Schenectady Cast Stone Co., Inc., Schenectady, New York
Raymond W. Bartlett, West Creek, New Jersey
Concrete Masonry Corporation, Elyria, Ohio—4 units
Fizzano Brothers, Inc., Crum Lynne, Pennsylvania
Maule Industries, Inc., Miami, Florida—2 units
South Hammond Concrete Products Co., Hammond, Indiana
Peoria Concrete Construction Company, Peoria, Illinois
Bestone Incorporated, Chardon, Ohio
Flower City Builders Supply Corp., Rochester, New York
Hitterhouse Concrete Products, Chambersburg, Pennsylvania
Marquart Concrete Block Company, Waterloo, Iowa
The Plasticrete Corporation, New Haven, Connecticut—2 units
The Cleveland Builders Supply Co., Cleveland, Ohio—2 units
Putnam Mason Supplies, Inc., Carmel, New York
Tait Block and Supply Company, Port Huron, Michigan
Columbia Concrete Products Co., Des Moines, Iowa
Park Avenue Cement Block Co., Inc., Cranston, Rhode Island
Adolf Jandris and Sons, Inc., Gardner, Massachusetts
Daggett's Concrete Products, South Haven, Michigan
Fairlawn Supply and Coal Company, Akron, Ohio
Polyack Brothers, Zenda, Wisconsin
Atlas Concrete Products, Inc., Flint, Michigan—2 units
Allen County Concrete Products, Lima, Ohio
Meekins, Inc., Hollywood, Florida—2 units
Carl Krebs, Fort Thomas, Kentucky
New Castle Duntile Company, New Castle, Pennsylvania
Iowa Concrete Block & Material Co., Des Moines, Iowa
Foster Builders Supply Company, Port Huron, Michigan
Lima Cement Products Company, Lima, Ohio
Picone Brothers, Farmingdale, Long Island, New York

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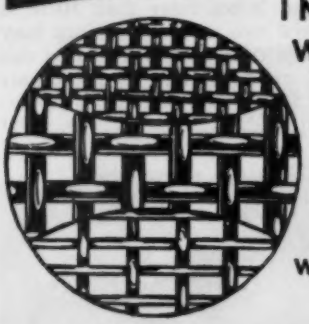

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Heavy, Split-Cowhide Mitten No. 300
$12.60 per dozen pairs.

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ORDER SAMPLE PAIRS AT "PER DOZEN" PRICES

DES MOINES GLOVE & MFG. CO.
DES MOINES, IOWA

• A new precast structural concrete floor system with underfloor electrical distribution has been announced by The Flexicore Company, Inc., and The Conduflor Corporation. This system uses the hollow cells in Flexicore precast concrete floors as electric raceways and provides electrical floor outlet spacing as close as 5⅓ in. It also permits the installation of additional outlets in the future, at nearly any location. The floor is electrified by metal feeder ducts which are installed on top of the structural floor in a 1½-in. concrete fill. The feeder ducts run at right angles to and feed the cells in the floor. **(104)**

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Low cost, expert workmanship and our thorough experience mean for you profitable operation and dependable performance.

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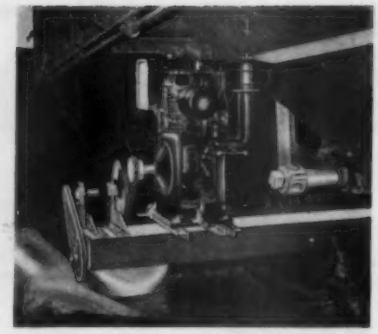
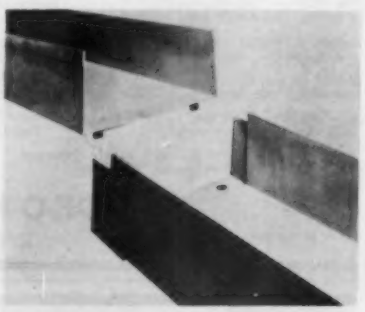


• Model P-51 overtrack portable conveyor, manufactured by the Andrews Machine Company, offers a simple, efficient method of unloading covered hopper railroad cars. Completely portable, the conveyor weighs only 140 lb. and has a capacity of 30 t.p.h. of cement. **(105)**



• Cincinnati Metalcrafts, Inc., has introduced a new concrete chute in sections. When more than 10 ft. is required two or more sections may be coupled together by means of two stationary pins and two ordinary nails. Each 10-ft. section can support a full load of concrete. **(106)**

• The George W. Hoffmann Company announces its latest improvement in the new Vibrapipe process—a change from the collapsible core to the solid core. The core, built of a heavy steel plate and reinforced with stiffening ribs, is offered for any of the old or new Vibrapipe form sets. The vibrator, fastened in the solid core, produces a concrete pipe free from "flow line" obstructions. **(107)**

Maybe you haven't thought of "The Concrete Manufacturer" as a tool. Still, that's exactly what it is—a tool that can help you run your business more efficiently and more profitably.

What's more, it doesn't cost you a cent to subscribe to The Concrete Manufacturer. We'll send you our magazine free each month if 1) you are a *bona fide* producer of concrete masonry units and/or ready-mix concrete, and 2) if you let us know exactly what these products are.

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Racks are ruggedly constructed of high quality steel for all pallet and block sizes...and can be shipped sub-assembled for compact delivery and easier handling.

Send dimensions for your rack requirements to Columbia's engineering department. You will be furnished with prices at no obligation.

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Ask about Columbia's new one, two and three-rack motor-driven "push-button control" turntables. Also available in manual, semi-portable and fixed position combinations.

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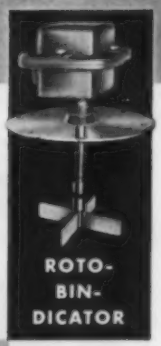
under
Pressure or Vacuum

New Roto-Bin-Dicator mounts outside bin, at any angle, for bin level signaling or machinery control. Material loads on paddle actuate Micro switch in motor housing. Flexible paddle shaft permits use with large or lumpy materials. **Explosion-Proof U. L. Listed Units Now Available.**



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EDI-COTE #103 is a revolutionary new release agent that prevents concrete from bonding to mixer blades and parts. EDI-COTE #103 eliminates the use of air guns and sledge hammers in the daily clean-up. EDI-COTE #103 creates a non-hardening film which prevents the forming of a bond between concrete and metal. It adheres rigidly and will not dissipate due to chemical action or abrasion. One application of EDI-COTE #103 will remain effective throughout the longest working day. EDI-COTE #103 can be applied with brush or spray. Shipped in 55 gallon drums. 5 gallon cans available for trial shipments only. Order EDI-COTE # 103 today!

* Frank Erdman & Son, Milwaukee, Wisconsin

Edick LABORATORIES
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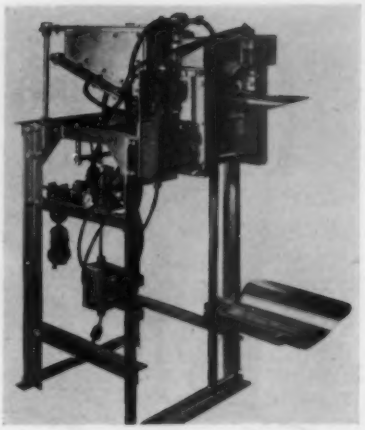
For further information on EDI-COTE #103, see your NCMA Technical Bulletin No. 2, Attachment No. 1, March 3, 1955.



• The new Black Diamond Airflow valve bag packer, manufactured by the Black Products Company, uses the fluidizing principle of conveying material. This principle, in combination with a special weight control mechanism, results in an automatic controlled weight bag filling device which eliminates many problems of valve bag filling operations. Features include simplicity of design, accuracy, and noiseless, clean operation. Only 4 to 12 c.f.m. of air is required to activate the material and operate the packer. Airflow is capable of filling bags weighing from 10 to 125 lb. packed weight. ▲ (108)

• Production of a new laborer's platform, part number M-75, has been announced by the Morgen Manufacturing Company, manufacturer of adjustable masonry scaffolding. This new platform makes possible the use of carts or wheelbarrows to speed up stocking. Morgen scaffolding consists of a 1-ft. base section with interchangeable extensions of 2, 6, and 10 ft. for greater flexibility and additional height. Extensions fit into the base section in sleeve-like fashion. Any height tower can be erected easily and quickly by two men without the use of tools or bolts. ▲ (109)

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MACHINE
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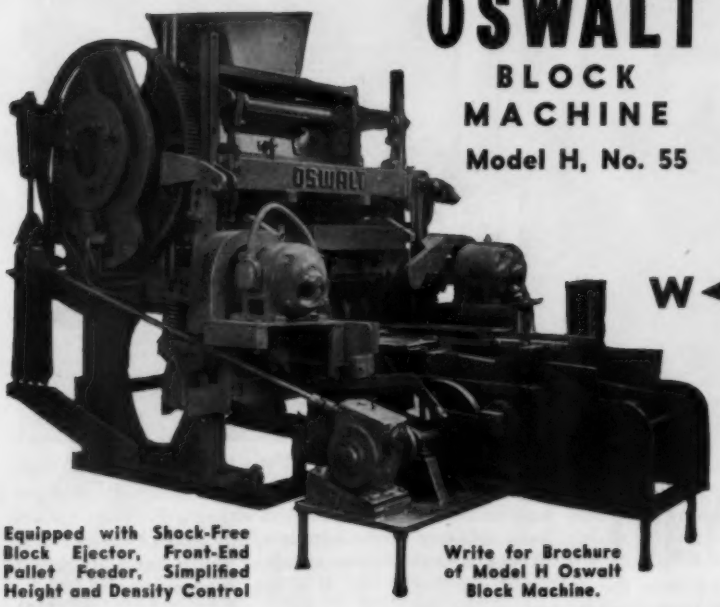

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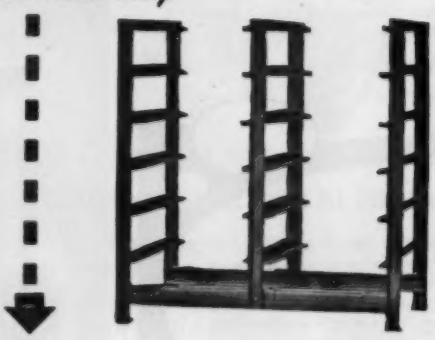

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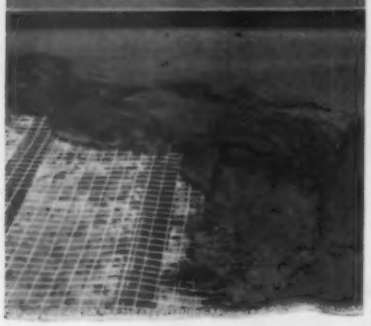
. . . the best way to make a light weight structural concrete



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ADVANTAGES:

- less heat loss through roof, thus reduced block curing cost
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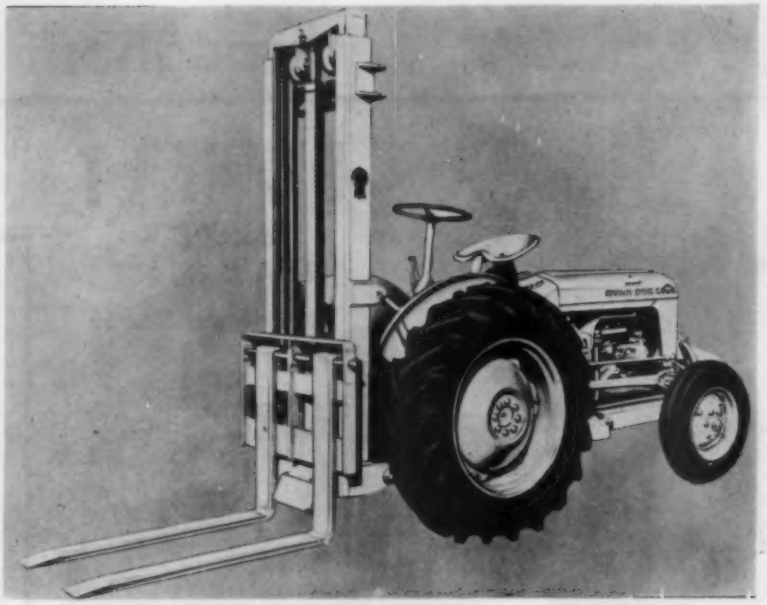

• The M-H-F Model 202 forklift is one of the five industrial tractors comprising the new line of Work Bulls now available from Massey-Harris-Ferguson Inc. A conversion unit reverses the seat and steering of the basic tractor, and places the load over the large wheels. The fork arms can be detached easily and replaced with either a blade or bucket to handle utility and clean-up work. The standard model has a lift height of 10 ft. and a capacity of 3,000 lb. (110)

• Rapid density tests of soils and construction fill materials can be made easily with the Volumeasure, a self-contained instrument incorporating the water-filled balloon principle. Soiltest, Inc., is the manufacturer. (111)

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EDMONT CASE NO. 603: Canvas gloves used in loading and unloading concrete block lasted 1 shift. On the same job, Edmont #30 plastic palm-coated gloves wore 5 to 6 shifts.

Job-fitted glove outwore canvas 5 to 1

No. 30 palm-coated knitwrist

The concrete products plant in the case above switched to *job-fitted* Edmont Monkey-Grip gloves because of their outstanding wear. Their special plastic palm coating resists abrasion and snagging . . . won't chip, crack or peel . . . is highly flexible with an excellent grip. For extra duty service, triple-thick palm styles available.

Free Test Offer to Listed Firms: Tell us your operation, materials handled. Without cost, we will send you gloves for on-the-job testing.

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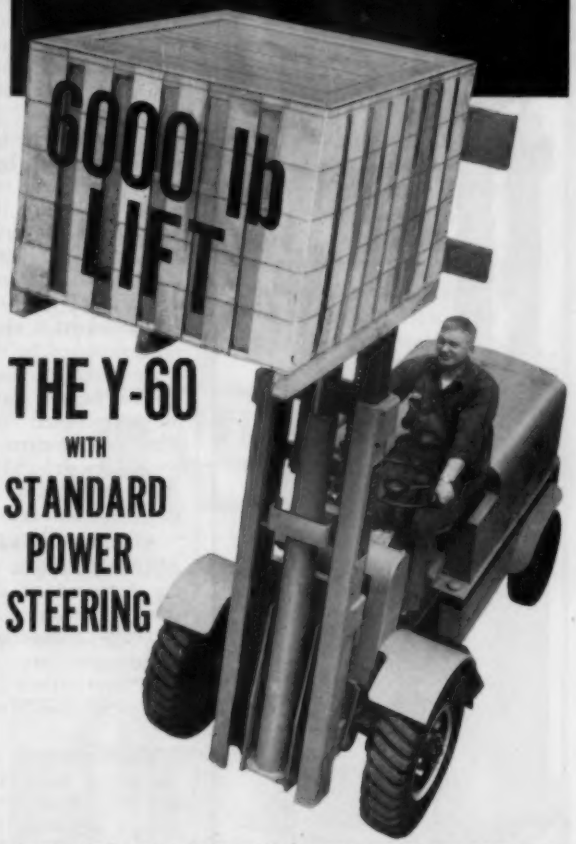

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ENGINEERED FOR RUGGED DUTY OUTDOORS WITHOUT OPERATOR FATIGUE. HIGHLY MANEUVERABLE UNDER ALL CONDITIONS.

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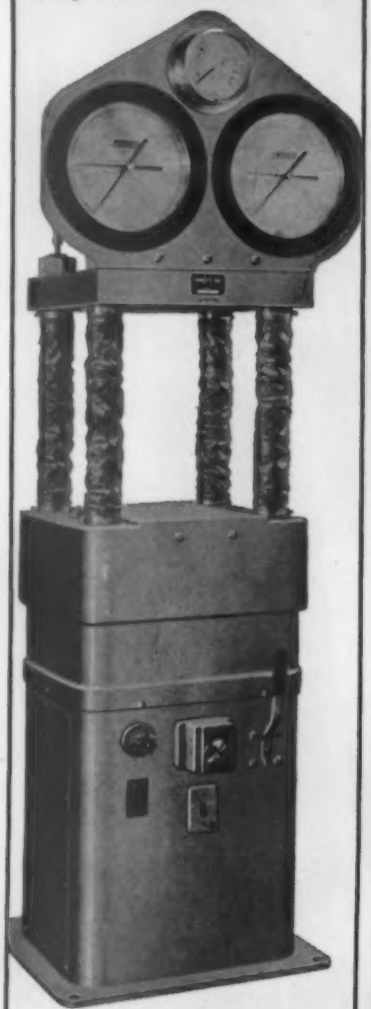
FORNEY

Compression & Flexure Testers



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New Literature

Super-Bondsit, a new liquid latex emulsion for preparing versatile concrete toppings, has been developed by *A. C. Horn Company, Inc., subsidiary of Sun Chemical Corporation.* substituted for most of the mixing water used in cementitious mixtures, Super-Bondsit is designed primarily for use in resurfacing, reconditioning, or repairing concrete surfaces. It also provides lasting adhesion to concrete, masonry, steel, and glass. **(112)**

A supplement to the Bergen *Better Equipment* book contains the many new items of equipment added to the Bergen line since the publication of the original book. Supplement No. 1 is offered free to block plant operators by the *Bergen Machine & Tool Company.* **(113)**

Plastiment, a chemical compound manufactured by the *Sika Chemical Corporation,* is added to concrete at the mixer. Particularly suitable for prestressed concrete projects, Plastiment controls setting time; increases workability, uniformity, strength, bond to steel; and reduces shrinkage and concrete defects. **(114)**

Aluminum windows, steel, brick, and block lintels, and steel columns are featured in a folder available from the *Stanley Building Products Company.* Descriptions, uses, and advantages are presented, along with illustrations and charts showing types and sizes of each product. **(115)**

Thorobond, a new liquid bonding agent manufactured by *Standard Dry Wall Products, Inc.,* improves adhesion between old and new concrete, plaster, and other materials. Circular No. 48, available from the manufacturer, describes Thorobond's characteristics, methods of application, and typical applications. **(116)**

Up-to-date engineering data, and dimensional charts for all sizes of both sump type and line type synclinal filters are included in *Marvel Engineering Company's* revised catalog No. 107. Catalog No. 200 contains complete data on filters for fire-resistant hydraulic fluids. **(117)**

Concrete forming equipment manufactured by the *Symons Clamp & Manufacturing Company* is described in detail in a new 24-page general catalog. Products are illustrated by on-the-job photos showing actual uses of the forms. Drawing and specifications are included. **(118)**

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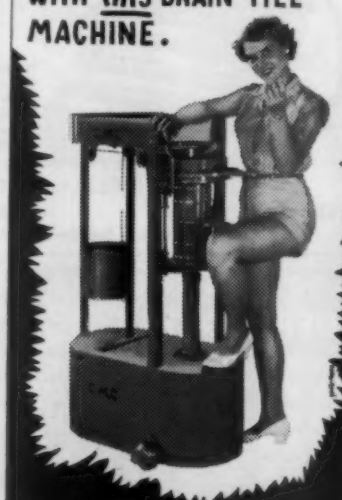

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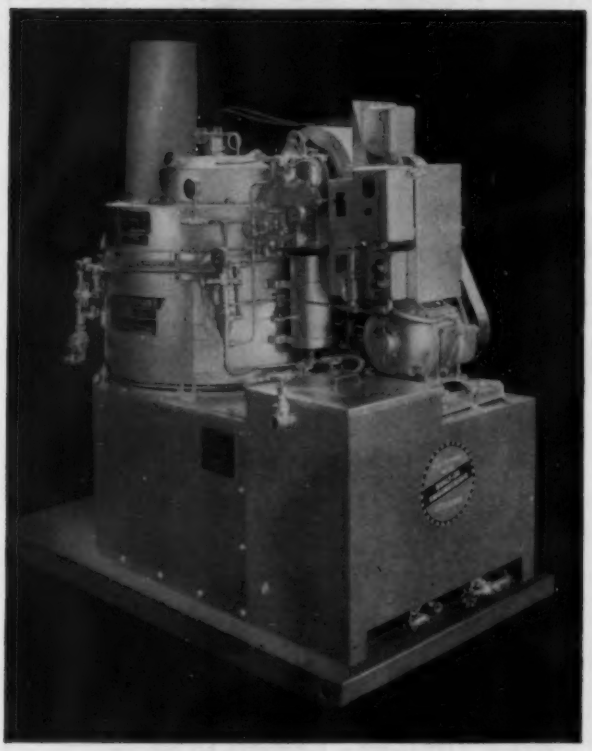

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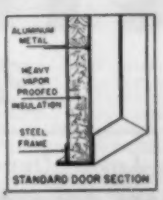

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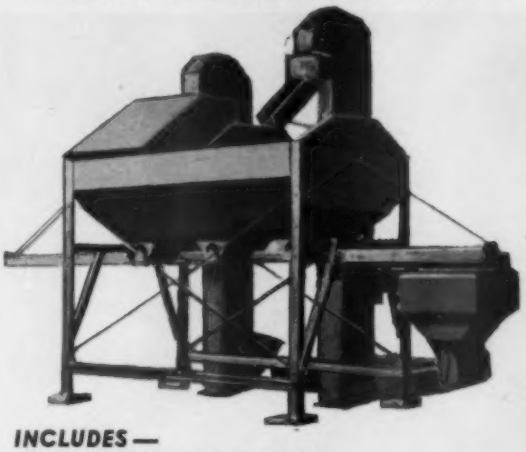

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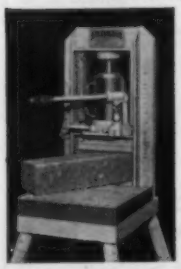

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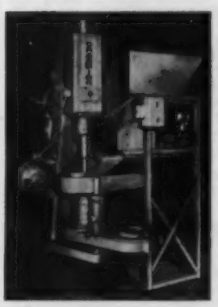

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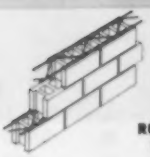

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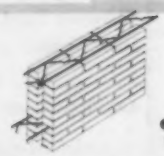

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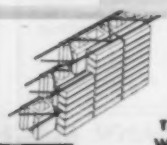

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BONDED WALL

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Concrete Manufacturer

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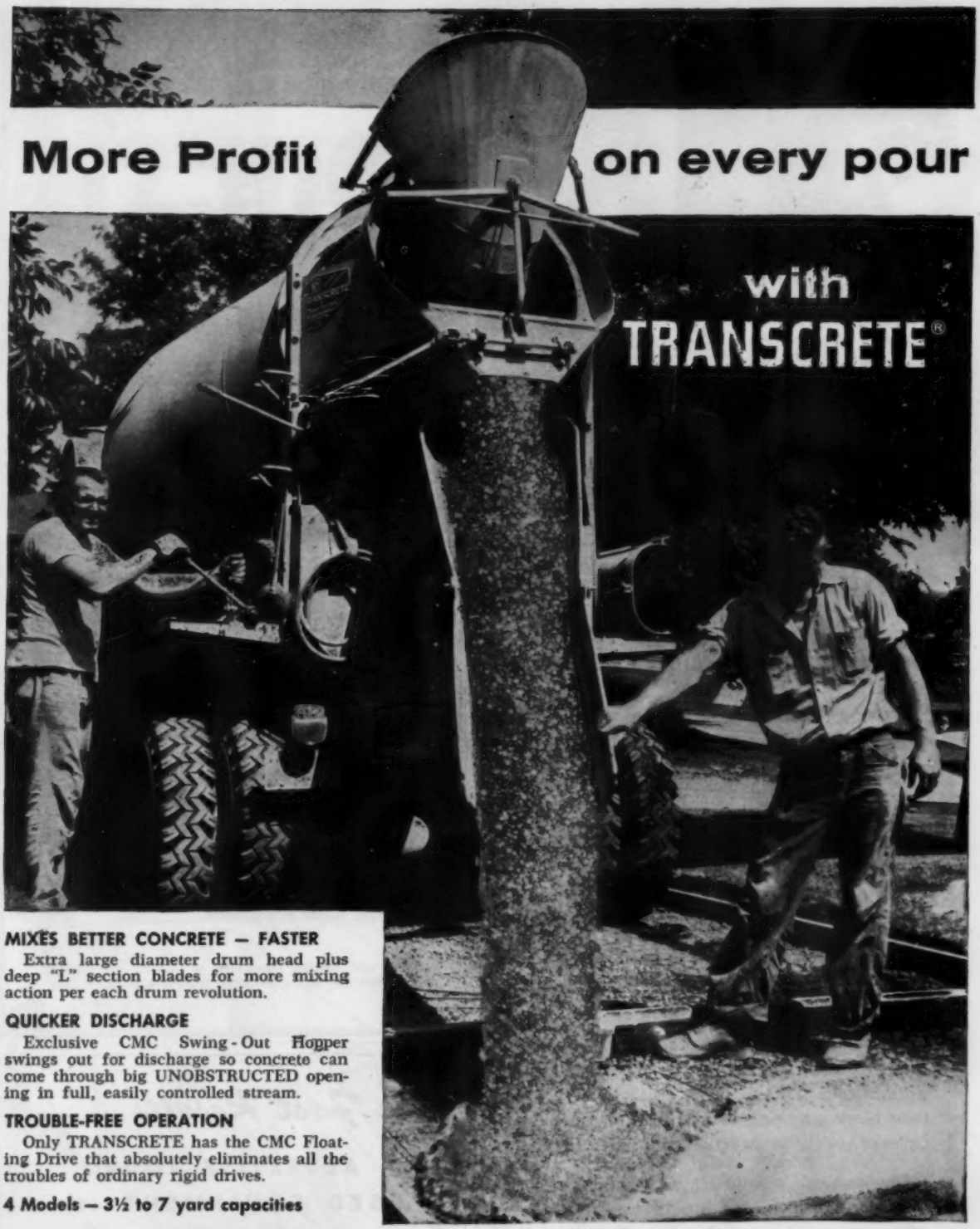

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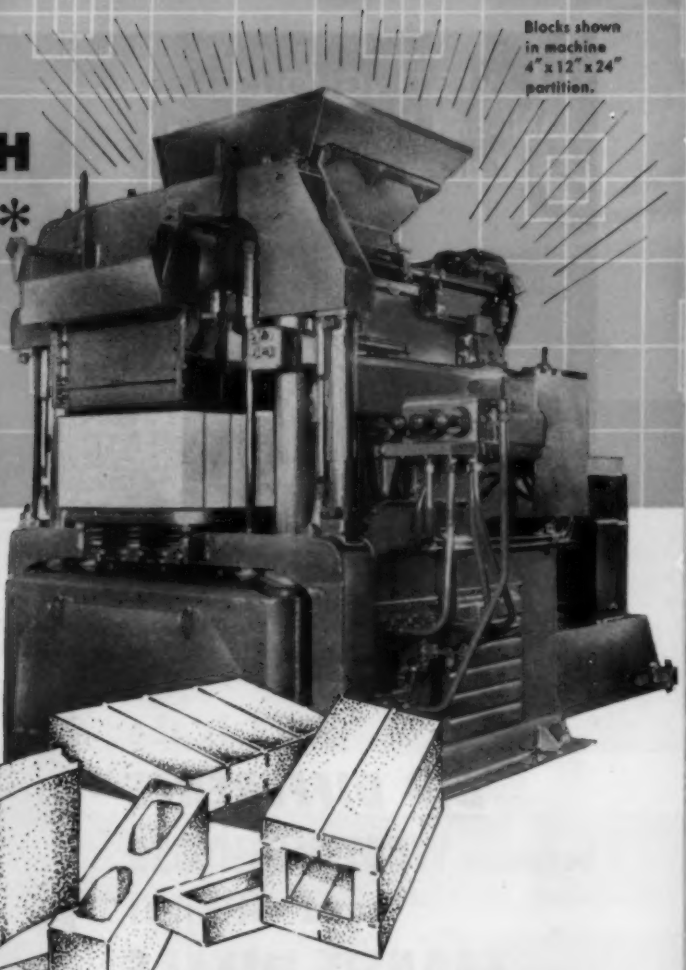

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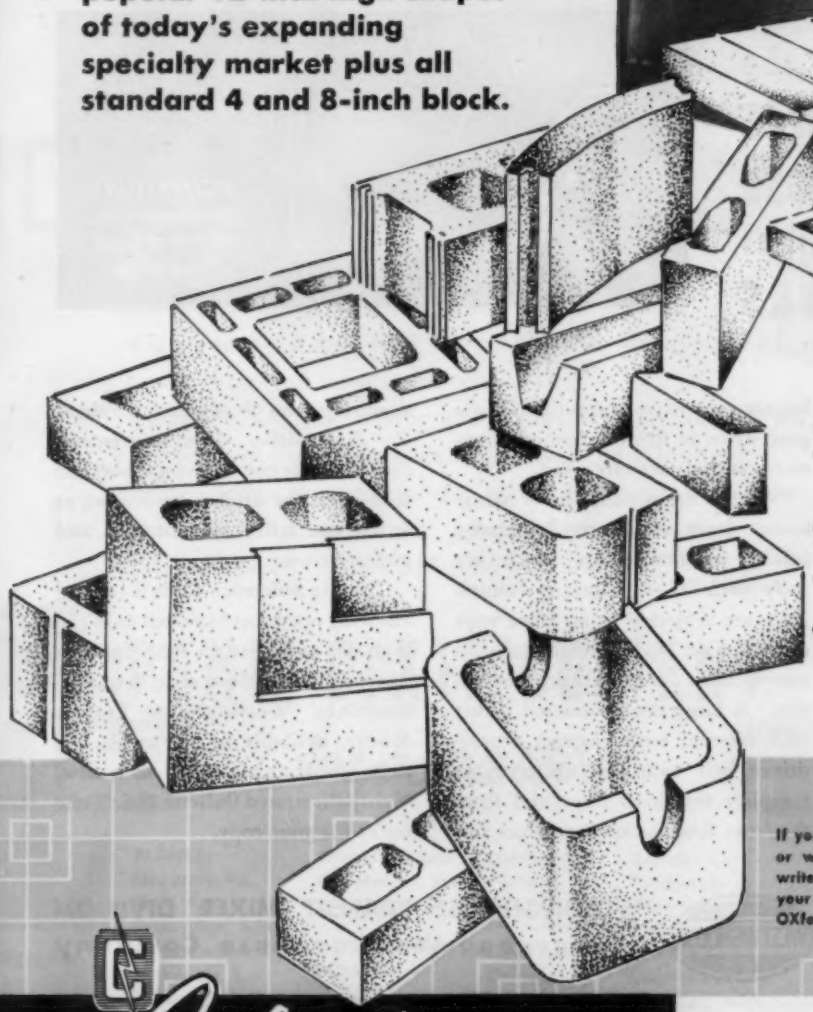

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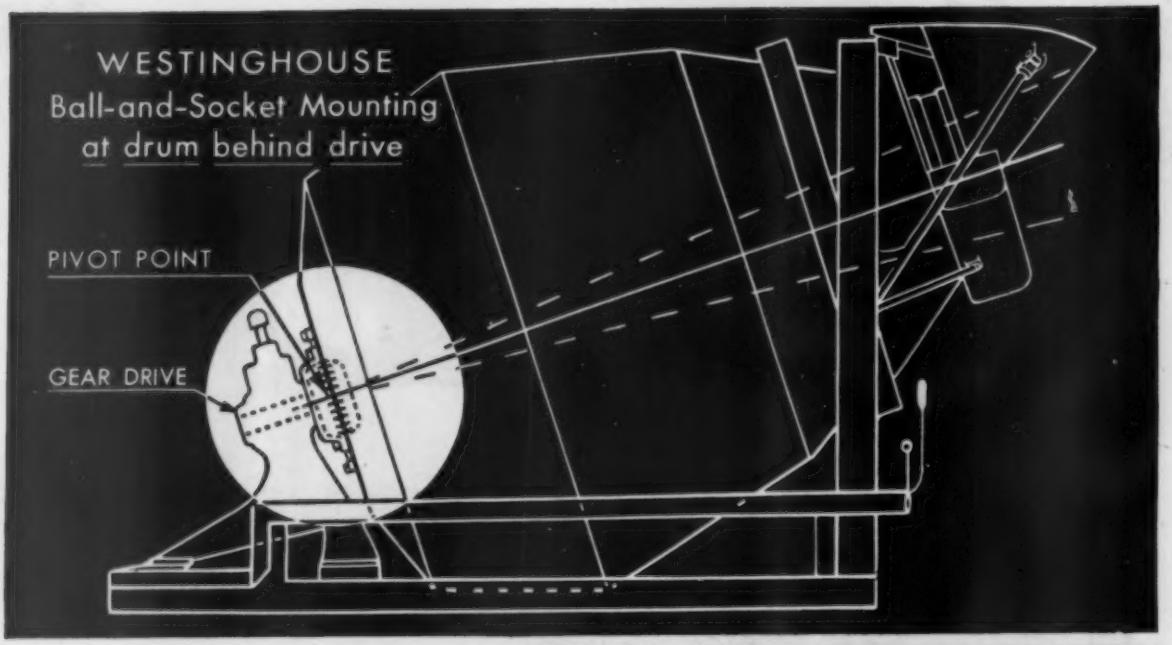

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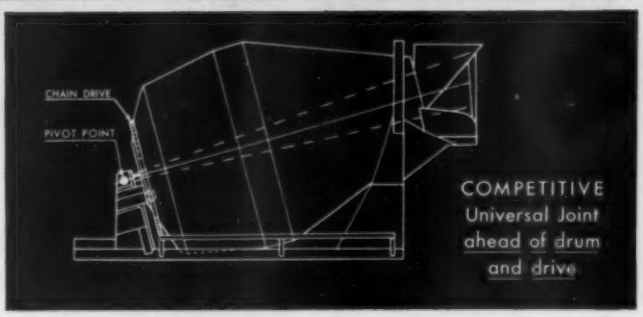

The drums on all transit mixers, except Westinghouse, are driven either by open chain or exposed rack and pinion. In spite of constant attention and lubrication such drives are subject to abrasive wear which results in jerky operation, breakage and high maintenance cost. The front drum mounting is *ahead* of such drives (see lower drawing). When the mixer travels over or stands on uneven ground the truck and mixer frames weave (as suggested by dotted lines in sketch) and the drive chain becomes too loose or too tight or the gear drive is thrown out of alignment causing excessive wear.

Now see top sketch. The Westinghouse drum is driven by husky, solidly mounted gears which are *fully enclosed*—a patented feature. They are subjected to no more wear and need no more attention than a conventional auto or truck transmission. A large drum-mounted socket with internal teeth engages a gear-driven ball with external teeth to complete the drum drive and form the front drum mounting. Since this mounting (and pivot point) is *behind* the drum drive, drum movement, caused by frame weaving, puts no stresses on the driving mechanism as is the case with chain or rack and pinion drives.

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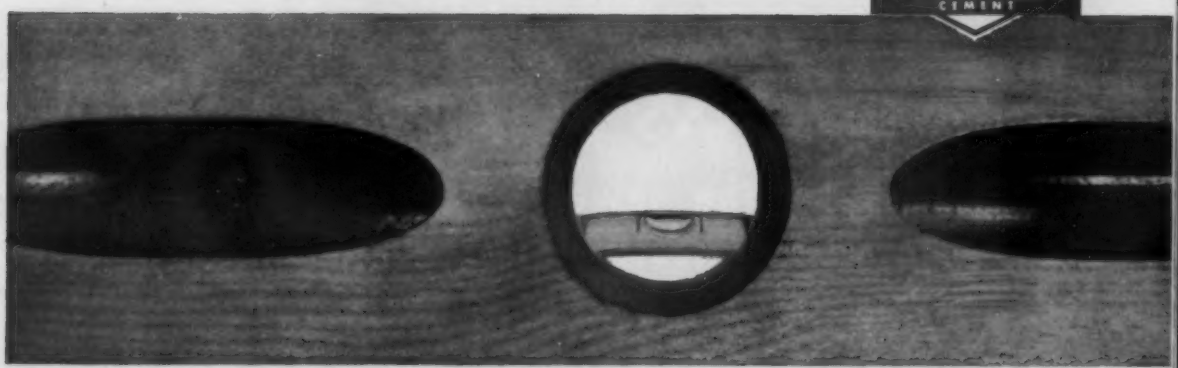

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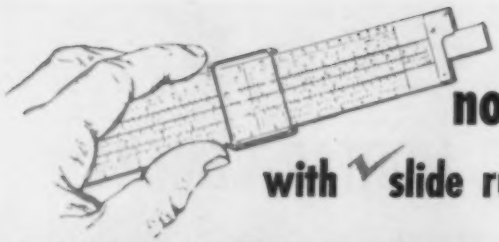

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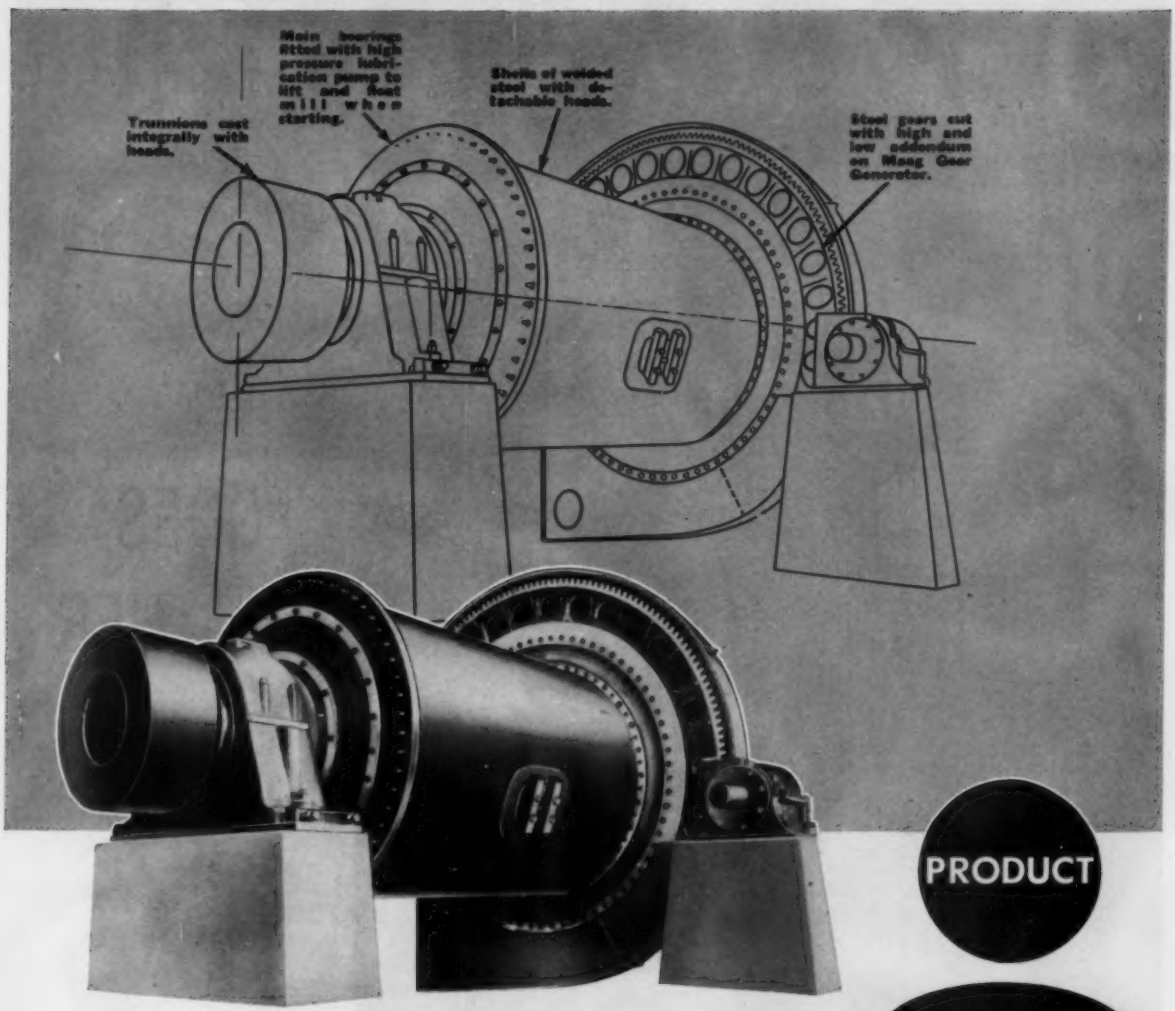
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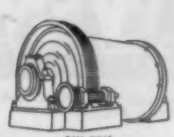
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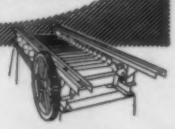
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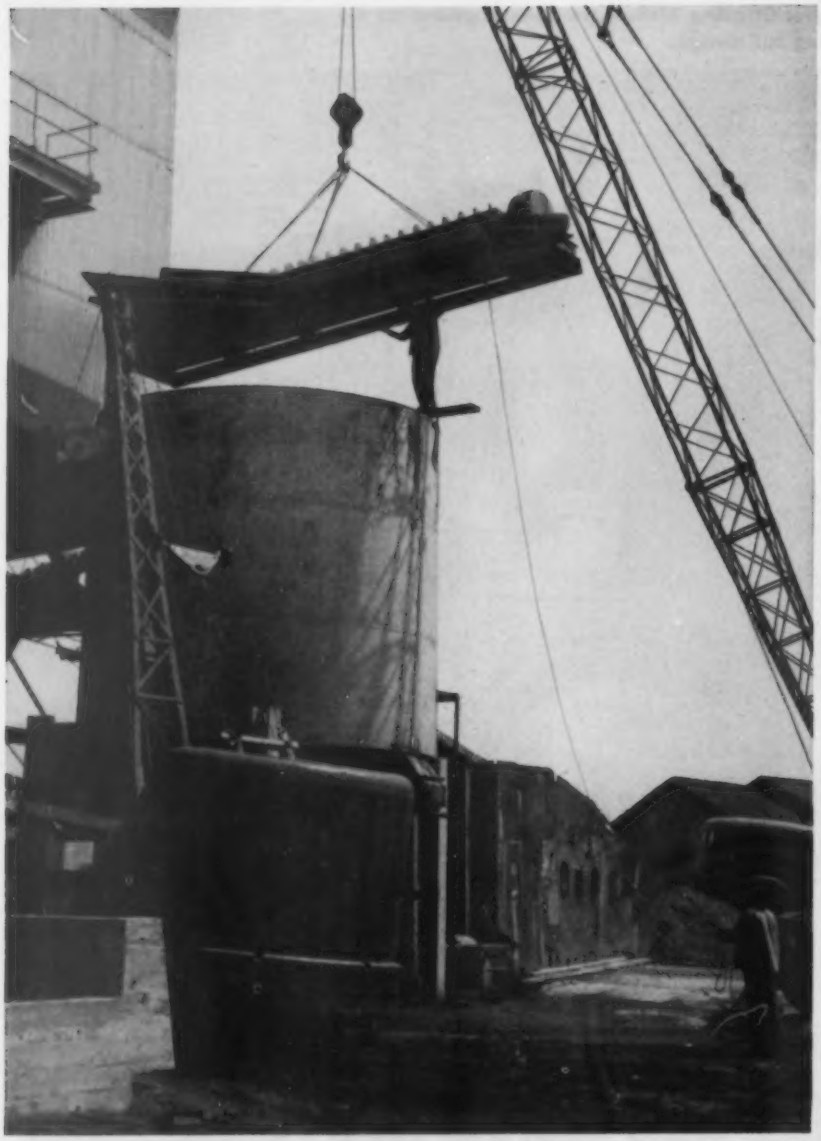

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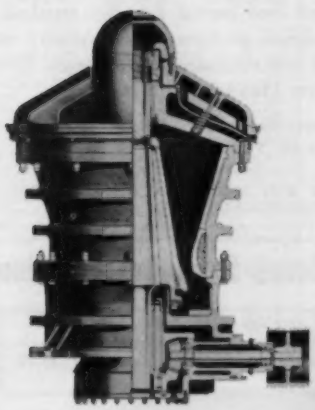

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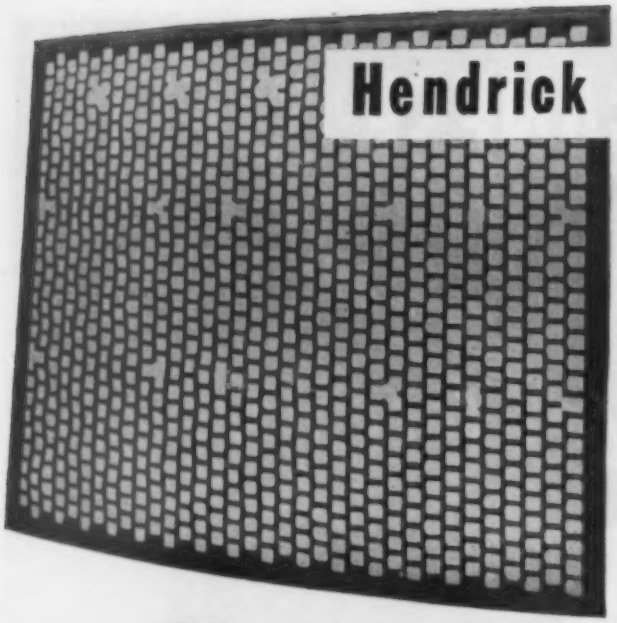

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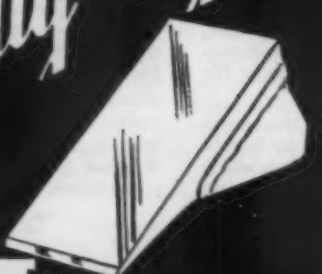

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Progressive firm operating three concrete plants and 35 mixer trucks in Southern city wants man between 25 and 35 years of age to handle operations of ready-mix business. Send full data on past employment, with position held, pay and reasons for leaving. All inquiries are strictly confidential. Write to:

BOX PQ-8032, c/o PIT & QUARRY PUBLICATIONS
431 S. Dearborn St. Chicago 5, Ill.

WANTED
LIME ENGINEERS

Well known manufacturer of building materials has excellent opportunity for graduate engineers with experience in lime manufacturing for an engineering position in its Chicago home office. In replying please state age, education, experience, and salary requirement.

PQ-7092, c/o PIT & QUARRY PUBLICATIONS
431 S. Dearborn St. Chicago, Ill.

POSITION OPEN

Chemical, Mechanical or Mining Engineer with experience in cement plant operation or Manufacturing Process Research. Pleasant location near Chicago. Interesting work, some travel. Reply to

BOX PQ-8012, c/o PIT & QUARRY PUBLICATIONS
431 S. Dearborn St. Chicago 5, Ill.

ASSISTANT POWER ENGINEER

Wanted by cement company located in middle Atlantic states for waste heat power generating plant. Opportunity to assume full charge in several years. Age preferably under 38. Write giving full details of education, experience and salary expected.

BOX PQ-9022 C/O PIT & QUARRY PUBLICATIONS
431 S. DEARBORN ST. CHICAGO 5, ILL.

WANTED

Used rotary kilns located east of the Mississippi River.

BOX PQ-7042, c/o PIT & QUARRY PUBLICATIONS
431 S. Dearborn St. Chicago 5, Ill.

FOR SALE

One 4 x 8 Hardinge Rod Mill complete, including speed reducer, 50 H.P. motor, rods and Slurry pump—$11,000.00—F.O.B. Martindale, New York. Write

BOX PQ-8072 c/o PIT & QUARRY PUBLICATIONS
431 S. Dearborn St. Chicago 5, Ill.

JAW CRUSHERS—6" x 3" to 60" x 48"

Before buying or selling any
FARREL-BACON JAW CRUSHERS
It will pay you to consult

BACON-PIETSCH Co., Inc.
Engineers & Manufacturers Send for Catalogue
22 Park Street
Montclair, N. J.

Machine Shop Facilities

FEEDERS
Conveyors,
Screens, etc.

FOR SALE

1—electric Rail Car Puller
1—Telsmith 24" Plate Feeder
1—1½ yd. Owen Clamshell Bucket
1—2x6 single deck Vibrating Screen
1—Model 7 Northwest Dragline
1—Euclid Model No. 1Z Bottom Dump 30 K.W. Diesel Generator Sets 220-440 Volt 3 phase

COOGAN GRAVEL COMPANY
903 Jefferson Bldg. Peoria, Ill.
Phone 3-9553

BIG ECA VALUES & STOCKS at right prices!

4—8-ton Standard Gauge Locomotives: 3 Brookville, 1 Plymouth.

2—Worthington (late model) Air Compressors Model M-80, 445 cu. ft. displacement, V-belt drive, with 75 HP. G. E. 220/440-60C-3 ph. motors. Motors and compressor mounted on common base. Overall length of each unit 89", width 51", height 54". Thoroughly rebuilt.

1—35-40 ton Model 8 Industrial Brownhoist Diesel Locomotive Crane, Serial #11401, with 50' boom, powered with Caterpillar D13000 diesel engine. Cap. 70,000# @ 12' radius; 84,000 @ 12' radius with outriggers. Thoroughly rebuilt. Your most rigid inspection invited. Located at our Clifton Heights, Pa. plant.

1—American Model 530-70 Steel Stiffleg Derrick with 70' boom, 12' bullwheel. Cap. 6-ton @ 48' radius with 70' boom; 10-ton @ 28' radius with 50' boom.

1—Ingram 4-ton all-steel Stiffleg Derrick with 5' boom, 8' bullwheel. Cap. 4-ton @ 28' radius.

Write for New ECA Stock List No. 456

Equipment Corp. of America
CLIFTON HEIGHTS, PA. BOX P-608, Sub of Phila.
PITTSBURGH 30, PA. Box P-933
CHICAGO 4, ILLINOIS 327-P S. LaSalle St.
NEW YORK 7, N.Y. 30-P Church St.

RAILS - TIE PLATES

Frogs & Switches—Track Accessories

W. H. DYER CO., INC.
2110-P Railway Exch. Bldg., St. Louis 1, Mo.
Stocks at Various Points

FOR SALE

Ty-Electric Heater units for 4' x 10' Hummer screens. Can be used on other screens. Good operating condition. Located in Youngstown, Ohio. Bargain.

B. A. DAVIS, RM. 3224
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Financial 6-4350

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2 Quarry sites. One in South Carolina. The other in Georgia. Both are in heavy populated areas of Piedmont Section. Plenty of water and electricity available. Contact:

JOHN B. SMITH
Athens, Ga.

FOR SALE BY OWNER

3 Hammermills—24" x 24", Eagle Crusher Co.
2 Locomotives—8 and 12 ton, 36" gauge Plymouth, Gasoline
22 Cars—2 yard capacity, 36" guage, Atlas Car and Manufacturing Company
1 Screen—3' x 8' single deck, W. S. Tyler dewatering
6 Pumps—3" Bingham Pump Company—Service liquid flotation feed 35' head, 475 G.P.M.
16 Pumps—4" Bingham Pump Company—Service liquid flotation feed 55' head, 290 G.P.M.
6 Flotation Cells—Morse-Wolning type. Size 42" x 42" x 48"
For further information contact J. H. Clements.

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Maple Grove, Ohio
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STONE AND AG LIME PLANT
COMPLETE UNIT
REAL ESTATE & EQUIPMENT
PLANT OPERATES YEAR ROUND
CAPACITY APPROX. 700 TONS
INDIANA STATE TESTED GRADE A. STONE
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LARGE SUPPLIER OF COUNTY HIGHWAYS.

Real Estate—21 acres

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2 shovels ¾ yd.
Haals loaded, No. 75
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150 H.P. Electric Motor 440
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8 smaller electric motors
2 - D 13000 Caterpillar power units
Sullivan air compressor & wagon drill
1 screen 4 x 12 Diester
1 screen 3 x 9 Bond

Located at Napoleon, Indiana, Ripley Co. Contact:

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Phone: Day 75, Night 15

WANTED

30″ Gyratory Crusher

42″ Gyratory Crusher

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Findlay, Ohio

FOR SALE OR TRADE

5′ x 8′ Simplicity Model BG single deck screen.
10″ x 16″ Roller Bearing jaw crusher.
18″ x 40″ Diamond reciprocating feeder.

Box 202

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ROTARY DRYERS

ROTARY KILNS

BALL & ROD MILLS

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WANTED TO RENT
WITH OPTION TO BUY

24 x 36 or 40 Portable Jaw Crushing Unit with Feeder and conveyor—Diesel Powered.

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Fields Lane Gravel Yard, Inc.
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WANT TO BUY

Steel guy derricks, 100′ boom, capacity 20-ton or better at low boom.

MINNESOTA GRANITE SUPPLY CO.
Delano, Minn.

FOR SALE BY OWNER

Two Traylor Vibrator Screens, 40″ x 80″, 220 V., 15 Amp. Type C VS7. Ideal for screening fine material. Can be demonstrated. Price $400.00 Each.

THE WALLACE STONE CO.
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FOR SALE

10 Kelly Kreb B-10 Centriclones with 10 HP motors. 2. Oliver United C16 Centriclones less motors. 1. 24″ Dorrclone comp. with cylindrical feed section and over-flow pipe.

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FOR SALE

COLLECTORS Cyclone Dry Type and Centrifugal Wash Type. Both have 10,000 CFM capacity.

HAMMERMILLS Jeffrey 42 x 24 and Pennsylvania S-6.

PAN CONVEYOR 36″ x 54′ with 7″ sides.

CLASSIFIER Dorr 26′ Bowl with rakes.

SCREEN 4′ x 6′6″ Robins Gyrex Double deck.

MOTORS 26 Sq. Cage from 5 HP to 75 HP 440/3/60.

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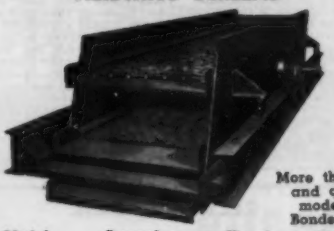
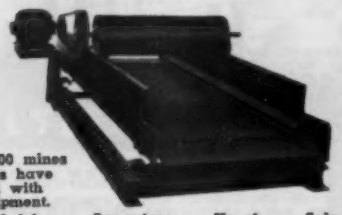
NEW BONDED® HEAVY DUTY VIBRATING SCREENS



More than 5000 mines and quarries have modernized with Bonded equipment.

Model Number	Screening Area	No. of Decks	Sale Price
138BS	3′ x 8′	1	1231
238BS	3′ x 8′	2	1282
338BS	3′ x 8′	3	1375
248BS	4′ x 8′	2	1865
348BS	4′ x 8′	3	2035
2410BS	4′ x 10′	2	1953
3410BS	4′ x 10′	3	2305
3412BS	4′ x 12′	3	2635

NEW BONDED® GENERAL DUTY VIBRATING SCREENS



Model Number	Screening Area	No. of Decks	Sale Price
124AS	2′ x 4′	1	$ 443
224AS	2′ x 4′	2	472
126AS	2′ x 6′	1	472
226AS	2′ x 6′	2	501
136AS	3′ x 6′	1	581
236AS	3′ x 6′	2	688
336AS	3′ x 6′	3	956
138AS	3′ x 8′	1	675
238AS	3′ x 8′	2	815
338AS	3′ x 8′	3	996

For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry. HEAVY DUTY MODELS: "Type BS," 4-bearing, positive throw, eccentric shaft; 3′x8′ to 5′x14′, 1 to 5 decks. GENERAL DUTY MODELS: "Type AS," eccentric weight mechanism, spring mounted, 1 to 3 decks, 2′x4′ to 3′x8′. Write for Bulletin 1086 & 1087.

NEW BONDED® TROUGHING IDLER CONVEYOR BARGAINS

Complete Ready-Fab sections quickly and easily joined together on the job. We take our loss on our stock of short length belting. You can save as much as 50% on the BONDED CONVEYOR SPECIALS listed, with conveyor belting in two pieces. Conveyors are equipped with 5″ roll diam. idlers and return rolls, 20″ diam. head pulley and 16″ diam. tail pulley mounted on 2¼″ or 2-7/16″ diam. shaft. Belt is new 4-ply, 28-oz. duck, ⅛″ top rubber cover x 1/32″ bottom cover and is fresh stock made by leading manufacturers.

CONVEYOR PRICES INCLUDE BELTING

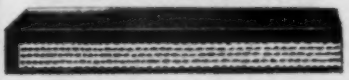
Belt Width	Length of Conveyor	List Price	Sale Price
14″	25′	$1397	$ 722
14″	50′	2222	1144
14″	85′	3377	1733
16″	20′	1262	636
16″	45′	2137	1088
16″	60′	2662	1359
18″	25′	1477	794
18″	45′	2217	1166
18″	70′	3142	1648
18″	85′	3697	1933
18″	100′	4252	2220
20″	25′	1517	828
20″	60′	2882	1533
20″	75′	3467	1838
24″	25′	1590	898
24″	45′	2430	1330
24″	70′	3480	1875
24″	100′	4740	2514
24″	120′	5580	2950
24″	150′	6840	3603
30″	50′	2911	1617
30″	70′	3871	2119
36″	25′	1818	1118
36″	45′	2858	1678
36″	60′	3638	2096

For conveyors longer or shorter than those listed above, add or deduct the following per foot prices according to belt width. Prices include belting.

For 14″ belt	$10.84 per foot
For 16″ belt	15.04 per foot
For 18″ belt	19.24 per foot
For 20″ belt	20.37 per foot
For 24″ belt	21.78 per foot
For 30″ belt	24.75 per foot
For 36″ belt	27.95 per foot

Write For Bulletin #1138

NEW CONVEYOR BELTING SAVE UP TO 25%



A high grade of heavy duty 4 and 5-ply, 28 oz. duck, ⅛″ top rubber cover x 1/32″ bottom rubber cover belt.

Width	Ply		List Price	Sale Price
14″	4	12-15#	$3.43 foot	$2.75 foot
16″	4	AFP	3.86 foot	2.88 foot
18″	4	800-1000#	4.27 foot	3.19 foot
20″	4	ACT	4.69 foot	3.69 foot
24″	4		5.55 foot	4.14 foot
30″	4		6.77 foot	5.06 foot
36″	4		8.01 foot	6.00 foot
16″	4	16-19# AFP,	4.59 foot	3.36 foot
18″	4	2500-3000#	5.09 foot	3.72 foot
20″	4	ACT or 24-	5.57 foot	4.24 foot
24″	4	33# AFP	6.56 foot	4.80 foot
30″	4	With 1800-	8.05 foot	5.89 foot
24″	5	2300 ACT	7.68 foot	5.61 foot

Additional widths and plies available at low prices. Write for Free Sample.

NEW IDLERS AND RETURN ROLLS 25% BELOW LIST PRICE

3-roll, 5″ diameter Troughing Idlers for:			
14″ belt	$18.50	24″ belt	$21.25
16″ belt	19.25	30″ belt	22.00
18″ belt	20.50	36″ belt	22.75
20″ belt	20.75	48″ belt	25.50

1-roll, 5″ diameter Return Idlers for:			
14″ belt	$7.25	24″ belt	$ 8.50
16″ belt	7.50	30″ belt	9.50
18″ belt	8.00	36″ belt	10.00
20″ belt	8.25	48″ belt	11.50

All steel. Interchangeable with other well-known makes. Furnished with easily replaceable pre-lubricated Sealed ball bearings. Also can be furnished with greasable type Alemite Fitted bearings at slight additional cost. Maintenance is negligible.

WRITE FOR FREE CATALOG AND PRICES

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Mfrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers and Feeders
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BALL MILLS—3'x4', 4'x8', 5'x6', 5'x8', 5'x10', 6'x5', 6'x7', 6'x8', 6'x10', 9'6"x11'.
HARDINGE MILLS—4'6"x16", 6'x14", 6'x22", 6'x26", 7'x22", 8'x36", 8'x48", 10'x48".
ROD MILLS—12"x24" LAB., 3'x10', 4'x8', 4'x9', 4'x14', 5'x8', 5'x10', 5'x14', 6'6"x14'6" & 8'6"x12'.
TUBE MILLS—5'x14', 5'x22', 5'6"x22', 6'6"x21', 42"x24".

HAMMERMILLS

JEFFREY—36"x42", 42"x36", 42"x48".
PENNSYLVANIA—2-SXR-100 TPH-THOR SXT 13-48"x54".
UNIVERSAL—No. 4, 36"x26", 3240 IMPACTOR.
CEDAR RAPIDS—3033.
WILLIAMS—GA-60-44x60 FEED OPENING.

APRON FEEDERS

54"x16'3"—54"x16'.

FILTERS—SEPARATORS—CLASSIFIERS

OLIVER DRUM—8x10', 12'14', 14'x18', 11'6"x18'.
DORR RAKE CLASSIFIERS—5'x25', 8'x38', 12'x31', 14'x30'.
DORR BOWL RAKE—3'x24'x12', 5'x30'x26', 16'x24'x28'.
WOODS SAND CLASSIFIER—72", 96".
CONVEYCO SAND CLASSIFIER—4'x10'.
17 THICKENERS—100', 80', 36', 24', 16' & 12'.
20"x15 EAGLE SINGLE SCREW COARSE MATERIAL WASHER.

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DRYERS—10"x21', 4'x20', 6'x40', 6'x60', 8'x125'.
KILNS—6'x28', 6'x7'x80', 7'x110', 9'x140', 10'x 165'.

JAW CRUSHERS

BLAKE TYPE—66"x84", 36"x48", 30"36", 24"x 36", 18"x36", 10"x32".
SINGLE SHAFT—25"x40", 20"x36", 18"x36", 10" x24".
CAM & ROLLER—24"x40", 14"x26", 11"x26", 10"x20", 6"x20".

GYRATORY FINE REDUCTION CRUSHERS

SYMONS—3', 4', 5½'.
KENNEDY—198, 258, 378.
SUP. McC.—6", 10", 18" A-C 322B.

GYRATORY PRIMARY CRUSHERS

6", 10", 14", 16", 20" & 36" SUP. McC.—Gates AL. CHAL. 3, 4, 5, 6, 7½, 8, 9 12K.

CONVEYORS

36" x 140' 30" x 160' & 30" x 200'.

STEEL DERRICKS

GUY: 8 TON 85 FT. BOOM, 25 TON 60 FT. BOOM, 15 TON 100 FT. BOOM, 20 TON 115 FT. BOOM, 50 TON 100 FT. BOOM.
STIFF LEG: 8 TON 70 FT. BOOM, 15 TON, 100 FT. BOOM, 25 TON 100 FT. BOOM, 75 TON 125 FT. BOOM, 1—8 TON 100 FT. BOOM.

ASPHALT & OIL TANKS

15—8,000, 10,000 & 20,000 GAL. CAP. WITH COILS. 6—10,000 GAL. R.R. CAR TANKS.

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177—DUMP STD. GA.—20, 16, 12, 6 & 4 YD.
36—FLATS—10 TON, 40 TON, 50 TON CAP.
44—TANK CARS—8,000 & 10,000 GAL. CAP.
75—7 Dump Cars, 1½ & 3 Yd.

R. R. CAR DUMPER

100 TON CAP. STD. GA. CAR DUMPER.

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198, 420 & 670 WORTHINGTON BELTED.
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1578 & 2200 CFM—OCE—CHGO. PNEU. ELEC.
3078, 3564 & 5040 CFM Inger. Rand.

DIESEL LOCOMOTIVES

1—25 TON, 1—80 TON GEN. ELECTRIC
2—25 TON PORTER, 1—45 TON WHITCOMB

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USED EQUIPMENT LIST SENT ON REQUEST

Crushers: jaw, cone, gyratory, roll, hammermills—Rod, ball & tube mills—Screening, washing & crushing plants—Screw, rake & bowl classifiers—Compressors—Conveyors—Blast hole drills—Dump cars—Engines—Feeders—Generators—Hoists—Kilns & dryers—Locomotives—Motors—Pumps—Pipe—Screens—Shovels & Draglines—Euclid trucks—Transformers—Weightometers.
3' & 4' Symons, 30" Sup. McCully, 20" Kennedy van Saun, Traylor TZ 3' GYRATORIES. 4 x 14 & 4½ x 16 FEEDERS. Pennsylvania SXC 1358 & SXC 100 HAMMERMILLS. Ingersoll Rand QM-2 Quarrymaster DRILL. 1300 cfm PRE-2 COMPRESSOR. 125 ton diesel-electric LOCOMOTIVE. Universal WASHING plant with Universal 880 Jr. crushing plant. AGGREGATE HANDLING equipment with approx. 1680 ft. of 24" conveyors, feeder, etc.—CEMENT mixing plant 400 yd. 8 aggregate compartment octo bin with 400 bbl. cement compartment, 995 bbl. silo. 1½ yd. SLACKLINE gravel plant complete with crusher, screen, bins, pump, tanks, power, etc.

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9' & 14' Gayco Air SEPARATORS
8 & 45 ton Plymouth Diesel LOCO 36" & std. ga.
1 & 1½ yd. Sauerman CABLEWAYS
Aggregate handling Equip w/1680' 24" conveyor Also BG18" x 30, 30" x 44', 24" x 45' & 24" x 60'
VIB SCREENS: 7—4 x 8' Tyler, 2—Link Belt 3 x 8 sgl. deck.
DRYERS: 3 x 24, 4½ x 40, 5½ x 30, 6 x 50, 7 x 110, 8 x 125. Cat. D8800, D13000, D17000, GMC260 HP DIESELS.
WASHERS: Eagle 7 x 20 log. Gruendler 24" x 18' paddle.
MILLS: 24" x 22", 4½ x 16", 5 x 14, 6 x 8 Ball, 5 x 14 Rod. 3033, 4033 CR, 3630 Dixie Ham.
CRUSHERS: 4 x 6, 7 x 9, 1016, 1030, 1324 w/feeder, 1836, 2436, 2450, 3042, 4042, 4248, 8466 JAW, 8K & 9K Gates, 10, 16, & 30" McCully. Traylor 2' 4" GYR. 1616, 2416, 4022 DBL ROLL 2' & 3' Symons CONE.
PLANTS: Pioneer 305W, CR Pitmaster, AW81.
Repres: Bonded Scale & Machine Co.

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Bucyrus Erie 110 B, all electric 4½ yd. shovel. New 1955. In tip-top condition. Located in Colorado, 100 miles S.W. of Denver. Price, loaded .....$140,000.

1055, P & H, combination shovel and dragline, serial #14178, new 1951, equipped with shovel attachment and 120' dragline boom, fairleads and lagging. No dragline bucket, caterpillar engine. Shows little wear and is in good operating condition. Price, F.O.B., Los Angeles .....$55,000.

1055, P & H, dragline, new 1950 serial #12262. In Colorado, approximately 125 miles West of Denver. Price, F.O.B., Colorado .....$34,500.

Northwest 80 D. shovel. New 1954. In tip-top condition. Location in Colorado. Price$48,000.

Northwest 80 diesel shovel, new in 1948. In good operating condition here in Los Angeles. Price .....$26,500.

Osgood model 800, 1½ yd. shovel. Serial #3205 powered by caterpillar D. 13,000 engine. Has not been overhauled but in good operating condition. Price, F.O.B., Oro Grande, California .....$11,500.

1½ yd. dragline attachment for the above Osgood shovel $2,500

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488 Bucyrus Erie Shovel 2 cy Diesel
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1—4' Standard Symons Cone Crusher complete with electric motor.

COOGAN GRAVEL COMPANY
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FOR SALE

1953 Jaeger 600 CFM Portable, UD-24 diesel, Pneu. tires. Like new	$ 6,500.00
1953 (2) Euclid Rear Dumps 80 FDT, Cummins diesel. Excellent .....ea.	14,000.00
Ramrods hardwood 2" dia. with metal male & female ends. 46" lg. .....ea.	1.50
Koehring 205 Cruiser Crane, 40' boom. Army surplus used little	7,000.00
Cat 12 #9K-5123 Grader. Army	4,500.00
Link-Belt LS-85 crawler, Cat diesel, heavy duty ¾ yd. Army	12,000.00
Link-Belt LS-50½ yard crawler with gas motor, 30' boom. Army	5,500.00
Link-Belt YC-9 10 ton yard-crane on solid rubber, 20' boom	3,000.00
Cat D-8 with LeT. angle-dozer. Army surplus used little	7,500.00

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2—New 6½'x150' kilns
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2—24"x14" Rogers Iron Works Crushing Rolls. Rebuilt
1—36"x16" rebuilt Sturtevant Rolls
1—24"x12" Farrell Bacon Crushing Rolls Rebuilt
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1—6", 10", 16" and 20" McCully Superior Gyratory Crushers
No. 3 up to 12 Gyratory Crushers

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6'x12', 5½'x10', 8'x6' Ball Mills
2—5'x16'; 1—5½'x10'; 1—4'x11' Rod Mills
2—5½'x20' and 5'x22', 6'x22' Tube Mills

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MISCELLANEOUS

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Sturtevant Automatic Coal Crusher Sampler
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BELT CONVEYORS: One 60″ x 170 ft., one 60″ x 200 ft., one 60″ x 300 ft., complete with all mechanical parts, belt and supporting structures.
DRILL: Quarry Master Drill with two diesel compressors, 40 ft. mast. New condition.
CAR DUMP: Link Belt revolving car dump, rotary type, 100 tons capacity, 62 ft. transfer table.
DRYERS & KILNS: Rotary Kiln 10′8″ x 104′, ¾″ welded plate, excellent condition. 2—Heavy duty 9′ x 70′ Dryers with all equipment, new condition.
FEEDER: Robins heavy duty, manganese steel, Oro Rock Feeder, 60″ x 14 ft., with 20 H.P. motor, reducer, etc. New condition.
PAN CONVEYOR: 48″ x 110 ft. complete with motor, reducer, etc., heavy duty type, designed for rock.
JAW CRUSHERS: 10″ x 20″, 15″ x 36″, 18″ x 30″, 24″ x 36″, 30″ x 42″, 42″ x 40″, with or without motors.
SHOVELS & DRAGLINES: Monighan Walker electric Dragline, 210′ boom with 8 yd., 12 yd. and 13 yd. buckets. Bucyrus Erie Monighan 200W diesel powered dragline, new 1951. One 3 yd. and one 6 yd. capacity Electric Shovels, 2300/4000 volts. Bucyrus Erie 52-B, 2¼ yd. combination, as a shovel or as a dragline. Marion 5 yd. electric, as a shovel or dragline or both, new 1951.
OVERHEAD ELECTRIC TRAVELING CRANES: 5 to 50 ton capacity, 20 ft. to 90 ft. span.

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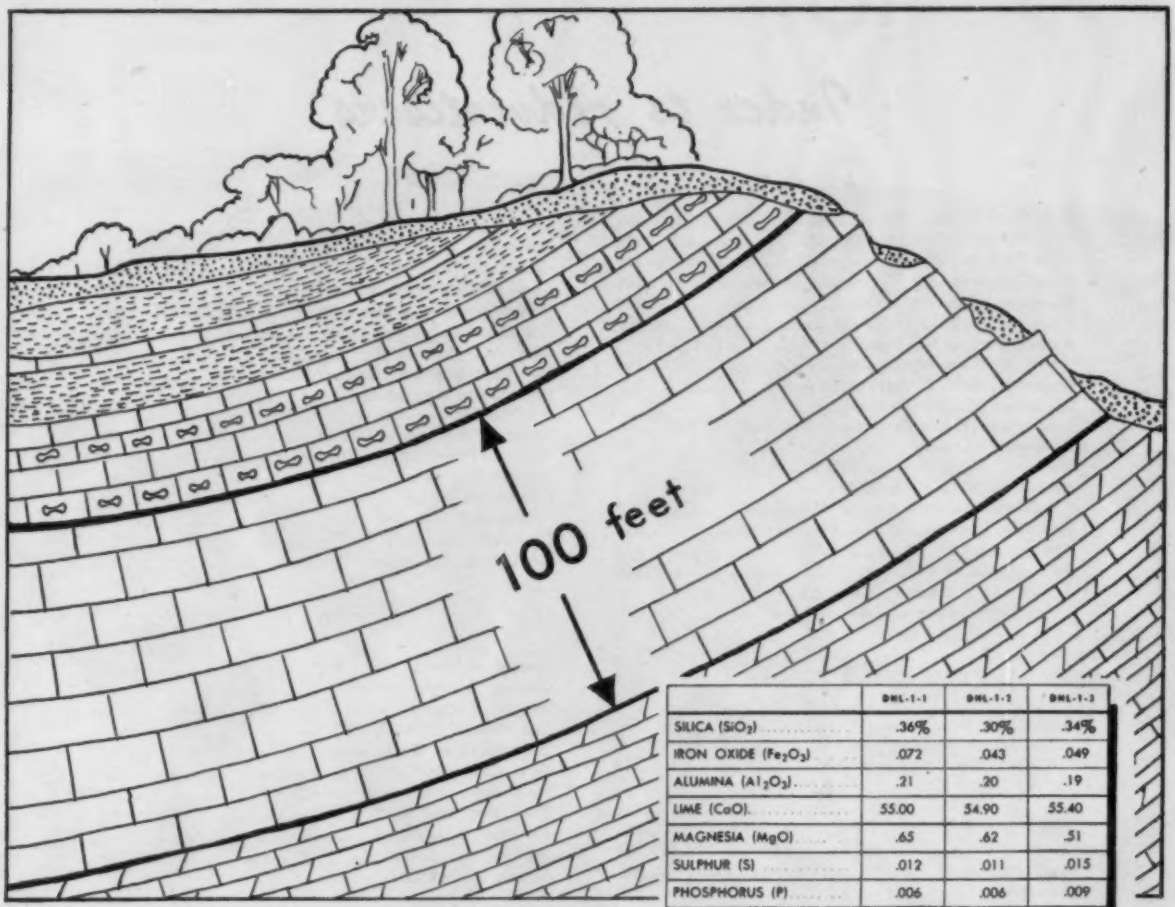

	DHL-1-1	DHL-1-2	DHL-1-3
SILICA (SiO_2)	.36%	.30%	.34%
IRON OXIDE (Fe_2O_3)	.072	.043	.049
ALUMINA (Al_2O_3)	.21	.20	.19
LIME (CaO)	55.00	54.90	55.40
MAGNESIA (MgO)	.65	.62	.51
SULPHUR (S)	.012	.011	.015
PHOSPHORUS (P)	.006	.006	.009
IGNITION LOSS	43.20	43.50	43.20
CALCIUM CARBONATE (Calculated)	97.90	97.72	98.51
MAGNESIUM CARBONATE (Calculated)	1.36	1.30	1.07

The above diagram of an outcrop shows the extensiveness of a typical limestone deposit in the Land of Plenty and the ease with which it can be quarried or mined.

Limestone for Cement and Chemical Lime Manufacturers

Limestone in the Land of Plenty—where deposits are known to be well in excess of 100 million tons–is so pure that the cost of processing it can be held to a minimum.

Scientific core drillings and laboratory tests have proven this limestone's great abundance and superior quality. Some of the beds are a startling 200 feet in thickness, and tests show that this limestone is almost 100% pure and is ideal for many uses.

If you're looking for a plant site with plenty of high-grade limestone close at hand, don't overlook the productive territory served by the Norfolk and Western. N&W specialists will be glad to discuss specific requirements with you in confidence and without obligation.

We believe the raw material you've been seeking may be found in the Land of Plenty's limestone.

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Drawer PQ-726 (Telephone 4-1451, Ext. 474)
Norfolk and Western Railway
ROANOKE, VIRGINIA

Norfolk and Western RAILWAY

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Good fragmentation and a low bank of broken stone—here's a typical example of how explosives research pays off. In quarrying, the proper selection and efficient use of industrial explosives minimize the need for secondary blasting, speed shovel production, and contribute to an overall economical operation.

Hercules is a pioneer in the manufacture of explosives, detonators, and in the development of modern blasting methods. Hercules' extensive service facilities are at your disposal for solving blasting problems, not only in quarrying, but for mining, on construction jobs, and in exploring for petroleum—in fact, wherever explosives are used.

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Wire Rope at Work—This monster, which looks like a cross between a battleship and a dragon, can scoop up 22 yd of earth at a single pull of the bucket. Its insatiable appetite for rock and dirt is its greatest asset, especially in stripping large areas where the overburden is thick.

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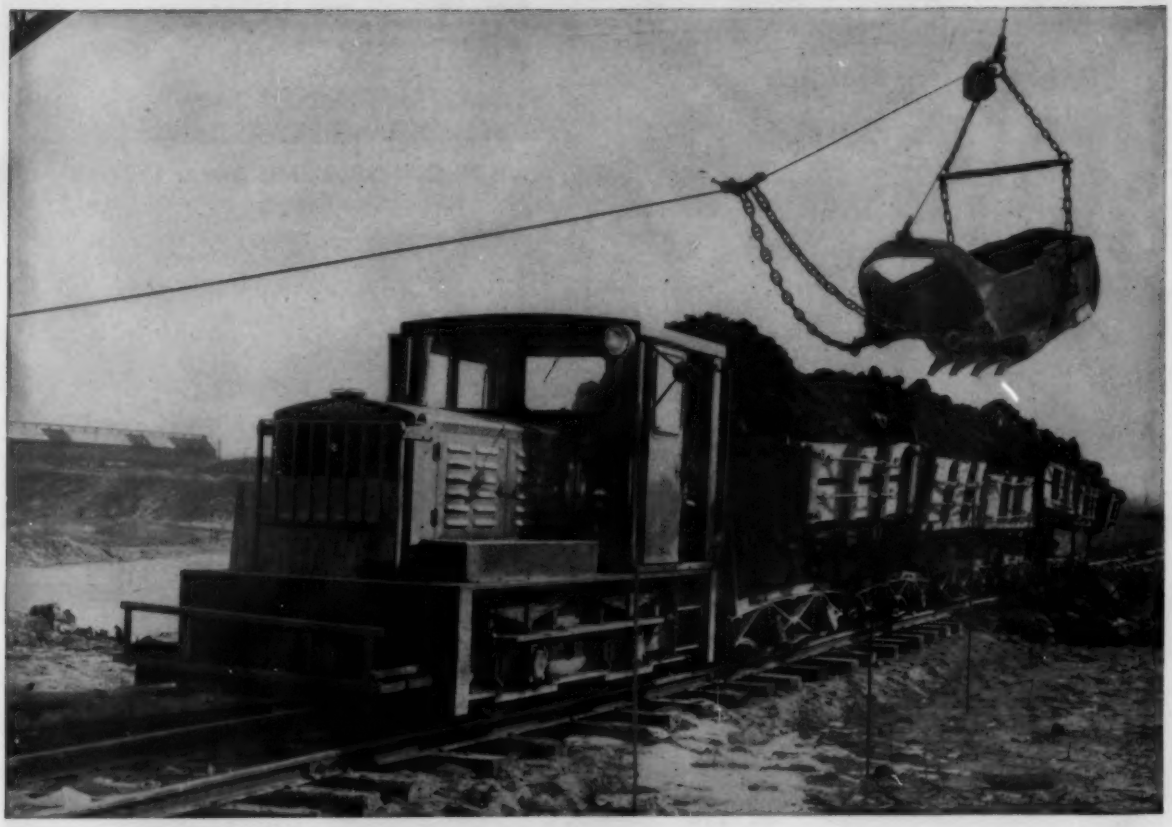

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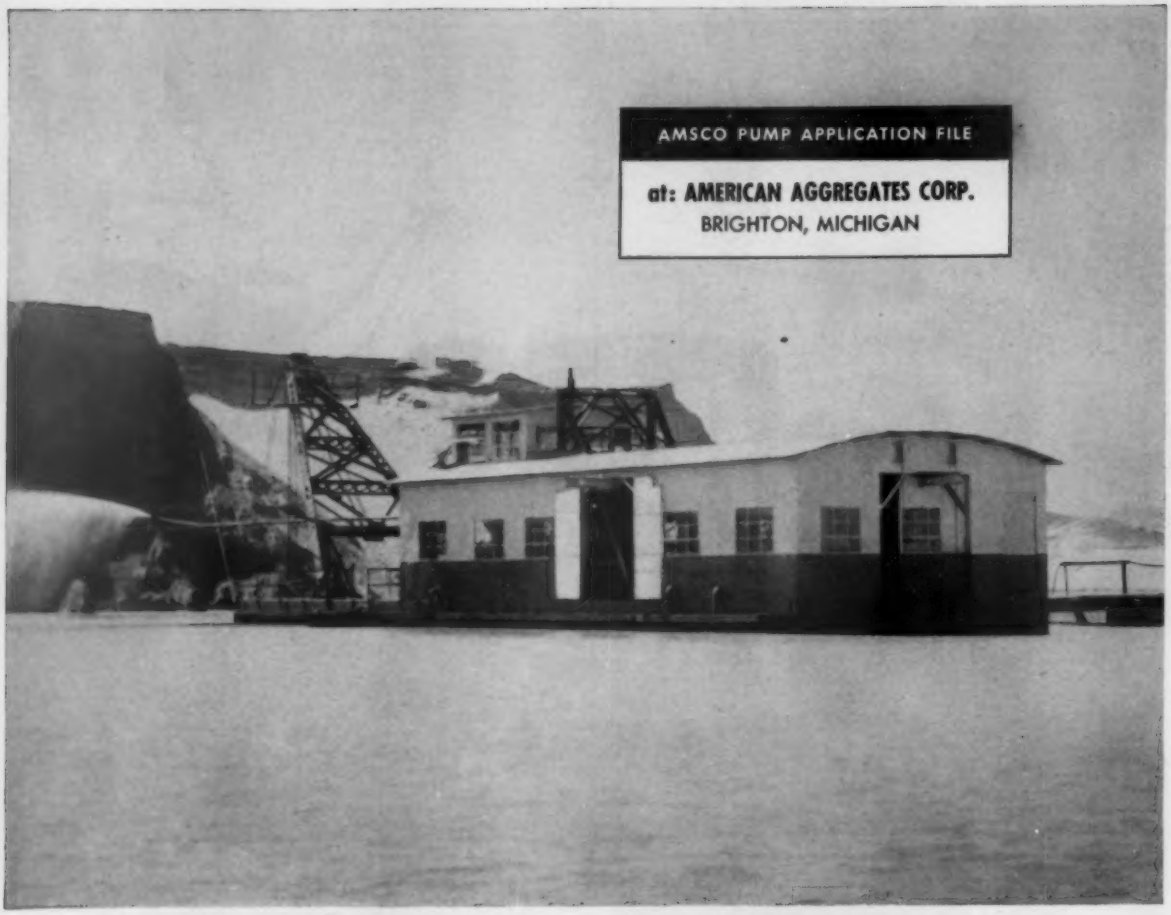

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Twenty-nine years ago, the Brighton operation of American Aggregates Corporation began hydraulic dredging operations with one 15″ Amsco pump. Today, they have 17 pumps in operation, including 6, 10, 12, 16 and 20″ units.

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Worm Gear
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